

XP
H947
V. 87
#1

PHYTOLOGIA

An international journal to expedite plant systematic, phytogeographical and ecological publication

Vol. 87

March 2005

No. 1

J. L. PANERO, New combinations and infrafamilial taxa in the Asteraceae.....	1
J. R. SPENCE, New genera and combinations in Bryaceae (Bryales, Musci) for North America.....	15
D. B. WARD, Keys to the flora of Florida -- 12, <i>Rubus</i> (Rosaceae).....	29
B. L. TURNER, A new species of <i>Seymeria</i> (Scrophulariaceae) from Oaxaca, Mexico.....	40
B. L. TURNER, A new species of <i>Ageratum</i> (Asteraceae; Eupatorieae) from Nayarit, Mexico.....	44
B. L. TURNER, <i>Bidens melchertii</i> (Asteraceae), a new species from Jalisco, Mexico.....	47
B. L. TURNER, A new species of <i>Trixis</i> (Asteraceae: Mutisieae) from Oaxaca, Mexico.....	50
B. L. TURNER, Elevation of <i>Stevia lemmonii</i> var. <i>hispidula</i> (Asteraceae: Eupatorieae) to specific rank.....	53
Botanical Anecdotes: <i>Bajacalia moranii</i> (Asteraceae: Tageteae), comments regarding its discovery.....	56
Botanical Humor.....	58
Index to new names and new combinations in volume 87(1).....	59
Subscription Information & Information for Authors.....	Inside back Jacket

XP
H947
V.87
#1

PHYTOLOGIA

An international journal to expedite plant systematic, phytogeographical and ecological publication

Vol. 87

March 2005

No. 1

J. L. PANERO, New combinations and infrafamilial taxa in the Asteraceae.....	1
J. R. SPENCE, New genera and combinations in Bryaceae (Bryales, Musci) for North America.....	15
D. B. WARD, Keys to the flora of Florida -- 12, <i>Rubus</i> (Rosaceae).....	29
B. L. TURNER, A new species of <i>Seymeria</i> (Scrophulariaceae) from Oaxaca, Mexico.....	40
B. L. TURNER, A new species of <i>Ageratum</i> (Asteraceae; Eupatorieae) from Nayarit, Mexico.....	44
B. L. TURNER, <i>Bidens melchertii</i> (Asteraceae), a new species from Jalisco, Mexico.....	47
B. L. TURNER, A new species of <i>Trixis</i> (Asteraceae: Mutisieae) from Oaxaca, Mexico.....	50
B. L. TURNER, Elevation of <i>Stevia lemmonii</i> var. <i>hispidula</i> (Asteraceae: Eupatorieae) to specific rank.....	53
Botanical Anecdotes: <i>Bajacalia moranii</i> (Asteraceae: Tageteae), comments regarding its discovery.....	56
Botanical Humor.....	58
Index to new names and new combinations in volume 87(1).....	59
Subscription Information & Information for Authors.....	Inside back Jacket

PHYTOLOGIA

(ISSN 00319430)

Phytologia, a journal of plant systematics, phytogeography and vegetation ecology, is published three times a year by the Warner Herbarium, a research unit of the Department of Biological Sciences, Sam Houston State University.

Editor

Justin K. Williams
e-mail: bio_jkw@shsu.edu
PHONE: (936) 294-1552
FAX (936) 294-3940

Subscription
Information &
Scholarly Exchange

Phytologia
P.O. Box 2012
Sam Houston State University
Huntsville, TX 77341-2012

e-mail: bio_jkw@shsu.edu

NEW COMBINATIONS AND INFRAFAMILIAL TAXA IN THE ASTERACEAE

Jose L. Panero

Section of Integrative Biology, University of Texas, Austin TX 78712,
USA

ABSTRACT

Molecular studies of Asteraceae support the recognition of tribe **Doronicaceae** of subfamily Asteroideae, subtribes **Anisopappinae**, **Athroismaeae**, and **Centipedininae** of tribe Athroismaeae, **Chromolepidinae**, **Dugesiinae**, **Enceliinae**, and **Spilanthinae** of tribe Heliantheae, and **Dyscritothamninae** and **Jaegeriinae** of tribe Millerieae. The combinations *Euphrosyne acerosa*, *Euphrosyne dealbata*, and *Euphrosyne nevadensis* are also proposed.

KEY WORDS: Athroismaeae, Asteraceae, Asteroideae, Classification, *Euphrosyne*, Heliantheae, Millerieae.

Comparative studies of DNA sequence data for several coding regions of the chloroplast DNA of the Asteraceae have revealed several lineages that require names to maintain a classification that reflects monophyletic groups. These studies expand on the results of Panero and Funk (2002) and are aimed at elucidating the major lineages of the Asteraceae recognized at the tribal level.

Doronicaceae Panero, **tribus nov.** –Type: *Doronicum* L.

A Asteroideae ceteris, differt characteribus conjuncte: habitu herbaceo; foliis alterniis, petiolatis, laminis integris; capitulis ligulatis; phyllariis 2-3 seriatis; receptaculis epaleatis; flosculis radorum pistillatis; flosculis discorum bisexualibus, corollis actinomorphis, lobis 5; antheris ecaudatis; ramis stylosum truncatis; cypselae teretibus 10-angularibus; pappi radorum presentibus vel absentibus, pappi

discorum presentibus, pappi 1-3 seriatis, setis papporum albis vel albo-flavis.

Perennial rhizomatous herbs. Leaves alternate, petiolate, sometimes clasping, blades ovate, elliptic or obovate. Capitulescences terminal, solitary or open paniculiform cymes. Capitula radiate. Involucre hemispherical, phyllaries in 2-3 series, herbaceous to somewhat chartaceous. Ray florets fertile, bifid or trifid, corollas yellow. Disc florets bisexual, fertile, corollas yellow, essentially glabrous or sparsely to moderately pubescent at base. Cypselas cylindrical to obovate with 10 ribs, brown to greenish or blackish, essentially glabrous to pubescent, pappose, sometimes absent on ray florets, pappus of capillary bristles arranged in 1-3 series, white to yellowish. Base chromosome number, $x = 30$.

Monotypic, *Doronicum* contains 26 species found mostly in Asia, Europe and northern Africa (Alvarez-Fernández, 2003)

The genus *Doronicum*, because of its distinctive chemistry and multiseriate involucre, has traditionally been allied to *Arnica* L. and relatives of the Madieae (Nordenstam 1977). Nordenstam (1994) believed *Doronicum* to be one of the most plesiomorphic members of the Senecioneae and consider the genus as an outgroup in his cladistic studies of the Calenduleae. Comparative DNA studies support the distinctive nature of *Doronicum* as an independent lineage of the Asteroideae with affinities to the Calenduleae clade. For this reason, I propose the recognition of tribe Doroniceae.

New subtribes of the Athroismeae

Athroisminae Panero, **subtrib. nov.** -Type: *Athroisma* DC.

A Athroismeae ceteris, differt characteribus conjuncte: habitu herbaceo; foliis alternis vel fasciculatis, capitulis discoformis; phyllariis absentibus vel 1-seriatis, receptaculis paleatis; flosculorum peripherialium pistillatis, corollis cylindraceis, flosculi discorum

bisexualibus vel fungenter staminatis, lobis (4-) 5; antheris caudatis, brevioribus; cypselae compressis, pappi vel squamis.

Perennial herbs, shrubs or small trees. Leaves alternate or fasciculate in brachyblasts, petiolate or sessile, petioles sometimes with a basal spine; blades linear, lanceolate to ovate, obovate, venation triplinerved or with a single vein. Capitulescence a congested glomerule-like solitary cyme or arranged in open to compact, paniculiform cymes. Capitula disciform or discoid, homogamous or heterogamous, involucre narrowly campanulate, phyllaries 0-2. Receptacle paleate. Florets all actinomorphic, female florets present or absent, 2 to several, corollas tubular, bisexual florets 2-25, corollas campanulate, white, greenish-white, purple or yellow-white, lobes (4-) 5; anthers (4-) 5, ecalcarate, caudate, thecae white to pale purple, appendages sometimes with apical gland; styles divided or filiform and undivided, filiform styles associated with functionally staminate florets, stigmatic area divided and confluent at style branch apices, sweeping hairs present at style apex, or slightly below, rarely present below the style branch bifurcation. Cypselae tangentially flattened, ovate to oval, obovate to obcordate, elliptic to suborbicular in outline, lateral ridges ciliate, black, pappus of fertile floret cypselas either a crown of twin trichomes, sometimes with recurved apices or of deeply lacerated and fused squamellae, sometimes with two stronger awns at lateral ridge of cypselae, pappus of functionally staminate floret ovaries with a variously lacerated crown or of a few, free, lacerated scales. Base chromosome number, $x = 10$

The subtribe contains three genera including *Athroisma* (12 spp.), *Blepharispermum* Wight ex DC. (15 spp.) and *Leucoblepharis* Arn. (1 sp.) with most species in eastern Africa, and a few species in western Africa, India, Madagascar, southeast Asia, and Indonesia.

Centipedinae Panero, **subtrib nov.** -Type: *Centipeda* Lour.

A *Athroismeae* ceteris, differt characteribus conjuncte: habitu herbaceo; foliis alterniis, capitulis discoiformis vel radiatis; phyllariis 1-2 seriatis, receptaculis epaleatis; flosculorum peripherialum

pistillatis, corollis zygomorphis, cylindraceis, ligulis brevioribus, lobis 2-3 vel absentibus; flosculi discorum bisexualibus, corollis actinomorpha, lobis 4; antheris caudatis, brevioribus; ramis stylorum subtruncatis, brevioribus; cypselae subteretibus, pappi absentibus.

Annual or perennial herbs. Leaves alternate, sessile, blades obovate, variously toothed, rarely entire. Capitulescence sessile to shortly pedunculate, axillary, rarely terminal, solitary. Capitula disciform or radiate. Involucre campanulate to hemispherical, phyllaries in 1-2 series, subequal, herbaceous. Receptacles shallowly convex, epaleate. Peripheral/radiate florets in several series, pistillate, fertile, sometimes lobes extremely reduced and corolla seemingly tubular, corollas creamy white, green, light yellow or purplish. Disc florets bisexual, fertile, corollas tetramerous, creamy white, green, light yellow or purplish, essentially glabrous with a few glandular trichomes, lobes of corollas not vascularized; stamens 4, anthers hyaline, tailed, ecalcarate, appendages wanting or if present, minute, oval; styles with two vascular strands, style branches with divided stigmatic surfaces, concave, urceolate in outline, apices acute, papillose. Cypselas subterete, deeply ridged, glabrescent on basal end, cells of distal end with raised apical tips, eventually tips elongating and forming biseriate trichomes, trichomes increasing in density at apical end forming a shallow cup around corolla tube, trichome cells shallowly ridged; pappus absent.

Monotypic, *Centipeda* contains five species found in Australia, southeast Asia, Africa and southern South America.

The genus *Centipeda* has been placed in several tribes including Anthemideae and Astereae but Bremer (1994), in his excellent account of the family, considered the genus difficult to place but maintained it in Asteroideae, unassigned to a tribe. Nesom (1994) believed the genus to be a member of the Astereae. Comparative studies of the ITS region of the nuclear ribosomal DNA by Wagstaff and Breitwieser (2002) found strong support for the exclusion of the genus from the Astereae. Their studies revealed *Centipeda* to be an isolated lineage sister to

Athroismeae and the Heliantheae alliance. More recent studies (Panero et al., in prep.) support the inclusion of *Centipeda* in the Athroismeae.

Anisopappinae Panero, **subtrib nov.** -Type: *Anisopappus* Hook. & Arn.

A Athroismeae ceteris, differt characteribus conjuncte: habitu herbaceo; foliis alterniis; capitulis radiates plerumque discoideis; phyllariis 1-2 seriatis; receptaculis paleatis plerumque epaleatis; flosculi radiorum pistillatis; flosculi discorum bisexualibus, corollas actinomorhis plerumque zygomorphis, lobis 5; antheris caudatis, brevioribus; cypselae subteretibus, pappi absentibus vel multi squamis.

Annual or perennial herbs. Leaves alternate, petiolate to sessile, blades linear to ovate sometimes subcordate, simple to pinnatifid, triplinerved, sometimes pinnate. Capitulescences terminal, solitary, open paniculiform cymes, rarely subumbelliform cymes. Capitula radiate, rarely discoid. Involucre campanulate to mostly hemispherical. Receptacles convex, rarely shallowly conical, paleate, rarely epaleate. Ray florets pistillate, sometimes with staminodes, fertile, corollas yellow. Disc florets bisexual, fertile, corollas 5-lobed, golden-yellow; stamens 5, anthers yellowish to brown, shallowly calcarate or ecalcarate, tailed, appendages ovate; style branches with divided stigmatic surfaces, with obtuse papillae. Cypselae subterete, edges wanting, epidermis without crystals, pappus of small scales or absent.

Monotypic, *Anisopappus* contains 40 species found mostly in Africa and Madagascar, with one ruderal species extending into southeast Asia and China.

New subtribes of the Heliantheae

Chromolepidinae Panero, **subtribus nov.**-Type: *Chromolepis* Benth.

A Heliantheae ceteris, differt characteribus conjuncte: habitu herbaceo, palustris

foliis alterniis, petiolatis, laminis integris vel lobatis/runcinatis; capitulis ligulatis; phyllariis 2-3 seriatis, dimorphis; receptaculis paleatis; flosculis radiorum pistillatis; flosculis discorum bisexualibus, corollis actinomorpha, lobis 5; antheris ecaudatis; ramis stylorum sublinearis, deltatis; cypselae radiorum compressis; cypselae discorum quadratis; pappi radiorum absentibus, pappi discorum coroniformibus, breviorum.

Rosette-like, perennial, semiaquatic herbs. Leaves alternate, petiolate, semi-succulent, ovate to narrowly lanceolate, entire or pinnatifid. Capitulescences axillary, solitary. Capitula radiate. Involucre campanulate, phyllaries dimorphic in 2-3 series, subequal, membranaceous with black markings. Receptacles convex, paleate. Ray florets pistillate, fertile, corollas white. Disc florets bisexual, fertile, corollas pentamerous, yellow; stamens 5, anthers yellow-hyaline sometimes with dark connectives, appendages papillose; styles with two vascular strands, style branch with divided stigmatic surfaces, apices broadly acute to shallowly deltate. Ray cypselas tangentially flattened, triquetrous to weakly quadrate in cross section, glabrous. Disc cypselas obpyramidal, quadrate, sparsely pubescent, conspicuously smaller than ray cypselas, pappus a crown of minute awns and squamellae, absent in ray cypselas.

Monotypic, *Chromolepis* contains one species found in vernal pools in mid elevation grasslands of central and western Mexico.

The Chromolepidinae occupy a derived position within the Heliantheae, sister to Dugesinae and collectively sister to Zaluzaniinae (Panero et al. 2001). Robinson (1981) placed *Chromolepis* in the Zaluzaniinae because of its fertile ray florets and shallowly quadrart cypselas. The genus is unusual among Mexican sunflowers because of its aquatic, rosette-like habit, and conspicuous blackish colorations on phyllaries and abaxial side of ray corollas. The heterochromatic capitula and dimorphic involucre of *Chromolepis* are characteristics not seen elsewhere in Zaluzaniinae.

Dugesiinae Panero, **subtribus nov.** -Type: *Dugesia* A. Gray

A Heliantheae ceteris, differt characteribus conjuncte: habitu herbaceo; foliis alterniis, petiolatis, laminis runcinatis, lobatis; capitulis ligulatis; phyllariis 2-3 seriatis; receptaculis paleatis; flosculis radiorum pistillatis; flosculis discorum fungenter staminatis, corollis actinomorphis, lobis 5; antheris ecaudatis; ramis stylorum sublinearis; cypselae compressis; pappi radiorum absentibus, plerumque coroniformibus breviorum.

Prostrate, stoloniferous perennial herbs. Leaves alternate, petiolate, blades obovate to oval in outline, runcinate to pinnatifid. Capitulescences axillary, solitary, or small paniculiform cymes. Capitula radiate. Involucres hemispherical, phyllaries in 2-3 series, subequal, outermost foliaceous. Receptacles flat to slightly convex, paleate. Ray florets pistillate, in two series, fertile, corollas lemon to golden-yellow with greenish to black veins on abaxial side, corolla apices deeply 2- rarely 3-lobed. Disc florets functionally staminate, corollas pentamerous, yellow; stamens 5, anthers black, appendages oval to trullate with a visible constriction between appendage and thecae, shallowly carinate; style branches of disc florets narrowly tapered and papillose, style branches or ray floret spreading with broad, divided stigmatic surfaces. Ray cypselas tangentially flattened, biconvex, essentially glabrous with a few trichomes on the neck, margins with shallowly lacerate wings, pappus absent or of a minute crown.

Monotypic, *Dugesia* contains one species found in disturbed, gravelly or sandy soils, in the dry highlands of eastern-central Mexico.

The Dugesiinae are sister to *Parthenium* with which they share strongly bifid ray corollas, tangentially flattened ray cypselas, and functionally staminate disc florets. More extensive sampling of the Heliantheae in the future may reveal subtribe Ambrosiinae to be paraphyletic and that *Parthenium* L. and *Parthenice* A. Gray should be included in the Dugesiinae.

Enceliinae Panero, **subtribus nov.**-Type: *Encelia* Adans.

A Heliantheae ceteris, differt characteribus conjuncte: habitu herbaceo vel fruticoso, foliis alterniis, petiolatis, laminis integris plerumque lobatis/dissectis; capitulis ligulatis plerumque discoideis; phyllariis 2-5 seriatis; receptaculis paleatis, paleae deciduis; flosculis radiorum plerumque pistillatis; flosculis discorum bisexualibus, corollis actinomorphis, lobis 5; antheris ecaudatis; ramis styli sublinearis; cypselae compressis; pappi absentibus vel 1-2 squamis.

Annual or perennial herbs, shrubs, rarely trees. Leaves alternate, rarely opposite, petiolate, rarely sessile, sometimes with resinous exudates, blades linear to ovate or trullate, sometimes lacinate, pinnately veined or triplinerved, rarely pentanerved. Capitulescences terminal, solitary and scapose, or in paniculiform or corymbiform cymes. Capitula radiate or discoid. Involucres turbinate, campanulate or hemispherical, phyllaries in 2-5 series, subequal, rarely graduated, herbaceous, rarely chartaceous sometimes with resinous exudates. Receptacles flat to convex, pales deciduous. Ray florets neuter or rarely pistillate and sterile, corollas golden-yellow sometimes with biseriate trichomes on tube, rarely on limb. Disc florets bisexual, fertile, corollas 5-lobed, golden-yellow or purple, mostly without fibers embedding the vascular strands, lobes sometimes with thickened cells or with glandular or multicellular trichomes on abaxial surfaces of the lobes; stamens 5, anthers yellow, brown or black, appendages ovate to linear, sometimes with glandular trichomes, endothecium cells fusiform, rarely quadrate with 1-3 polar bridges; style branches with fused stigmatic surfaces, some species with two stigmatic surfaces that fuse slightly above style bifurcation point, densely papillose below, apices acute to broadly acute. Cypselae radially flattened, rarely thickened or terete, obovate to oblong, densely sericeous, rarely glabrous, sometimes with conspicuous wings or corky edges on sides and neck, pappus of two slender awns (rarely absent) with or without squamellae in between them, rarely of awns fused to a crown surrounding the neck.

The subtribe contains five genera including *Encelia* (15 spp.), *Enceliopsis* (A. Gray) A. Nelson (4 spp.), *Flourensia* A. DC. (33 spp.), *Geraea* Torr. & A. Gray (2 spp.), *Helianthella* Torr. & A. Gray (8 spp.) found mostly in western North and South America.

The Enceliinae are an isolated lineage of the Heliantheae nestled between the Engelmanniinae and the clade containing the Ambrosiinae, Chromolepidinae, Dugesiinae, Helianthinae, Spilanthinae, Zaluzaniinae, and Zinniinae (Panero et al. 2001). The subtribe shares with subtribe Helianthinae sterile ray florets. In addition, the strongly flattened and sericeous cypselas, along with the caducous pales of the Enceliinae are only seen elsewhere in the Heliantheae in a few members of the Helianthinae (e.g., *Syncretocarpus* S. F. Blake, and some species of *Viguiera* Kunth).

Spilanthinae Panero, **subtribus nov.**-Type: *Spilanthes* Jacq.

A Heliantheae ceteris, differt caracteribus conjuncte: habitu herbaceo vel fruticoso; foliis oppositis, petiolatis plerumque sessilis, laminis integris plerumque lobatis; capitulis ligulatis plerumque discoideis; phyllariis 1-5 seriatis; receptaculis paleatis plerumque epaleatis, conoideis; flosculis radiorum pistillatis; flosculis bisexualibus, corollis actinomorpha, lobis 5 plerumque 4; antheris ecaudatis; ramis stylorum sublinearis; cypselae compressis; pappi presentibus, 1-3 squamis.

Erect or decumbent annual or perennial herbs, sometimes rooting at the nodes, rarely scandent shrubs. Leaves opposite, petiolate or subsessile, blades linear to ovate, sometimes reniform, entire, triplinerved. Capitulescences axillary or terminal, solitary, simple to congested cymes, peduncles sometimes fistulose. Capitula discoid or radiate. Involucre campanulate to hemispherical, phyllaries in 1-5 series, subequal, rarely dimorphic, mostly herbaceous, sometimes bases indurate and coriaceous. Receptacles convex to conical, especially with age, mostly paleate, rarely epaleate, pales chartaceous, rarely coriaceous. Ray florets pistillate, fertile, corollas purplish, yellow-orange or white. Disc florets, bisexual, fertile, corollas pentamerous,

rarely tetramerous, purplish, white, or yellow; stamens 5, rarely 4, anthers brown or black, appendages ovate or deltate with or without glands; style branches with fused stigmatic surfaces, apices acute and papillose, without appendages. Ray cypselae tangentially flattened, triquetrous, obovoid, sparsely to densely ciliate, trichomes with recurved tips with age. Disc cypselae radially flattened, sometimes peripheral ones triquetrous, terete, sometimes quadrate and narrowly rhombic, rarely square in outline, mostly shallowly winged or sometimes conspicuously winged, corky, ciliate, glabrous to sparsely pubescent, pappus of a minute crown, a single awn fused to a broad ring around the neck of the cypselae, or more commonly of 2-3 slender awns as a continuation of the wings, sometimes with squamellae in between.

The subtribe contains five genera including *Acmella* Rich. ex Pers. (30 spp.), *Oxycarpha* S. F. Blake (1 sp.), *Salmea* DC. (10 spp.), *Spilanthes* (6 spp.), and *Tetranthus* Sw. (2-4 spp.). Most species of the subtribe are found in the New World tropics, but a few species of *Acmella* and *Spilanthes* are endemic to the tropical and subtropical regions of the Old World.

The Spilanthininae are sister to the Zinniinae (Panero et al 2001) and share with them opposite leaves, the tendency for solitary, long-pedunculate capitulescences, and conical receptacles. The Spilanthininae differ from the Zinniinae in lacking marcescent ray corollas.

New subtribes of tribe Millerieae

Dyscritothamninae Panero, subtribus nov. -

Type: *Dyscritothamnus* B. L. Rob.

A Millerieae ceteris, differt caracteribus conjuncte: habitu herbaceo vel fruticoso foliis oppositiis plerumque alterniis, petiolatis vel sessilibus, laminis integris plerumque lobatis/dissectis; capitulis ligulatis plerumque discoideis; phyllariis 1-4-seriatis; receptaculis paleatis plerumque epaleatis; flosculis radiorum pistillatis; flosculis discorum bisexualibus, corollis actinomorpha, lobis 5; antheris

ecaudatis; ramis stylorum sublinearis; cypselae subteretibus; pappi presentibus, setis papporum plumosis.

Annual or perennial herbs or shrubs. Leaves mostly opposite, sometimes alternate, petiolate or sessile, sometimes clasping or perfoliate, blades linear to broadly ovate, sometimes trilobed to deeply lobed, rarely deltate or acicular, triplinerved, rarely uninerved. Capitulescences terminal, solitary and scapose or open paniculiform cymes, rarely congested cymes. Capitula radiate, rarely discoid. Involucres cylindrical, campanulate or hemispherical, phyllaries in 1-4 series, subequal, sometimes graduated and dimorphic with inner series chartaceous and much longer than the outer herbaceous series, sometimes reduced to only 4 fleshy, herbaceous phyllaries enclosing florets in a pyramid-like, valvate bud. Receptacles convex to conical, paleate, rarely epaleate, pales sometimes chartaceous, hyaline. Ray florets fertile, corollas golden-yellow, white, pink or magenta. Disc florets bisexual, fertile, corollas 5-lobed, golden-yellow, green, white, pink or purplish; stamens 5, anthers yellow or brown, appendages ovate; style branches with divided stigmatic surfaces. Cypselae mostly terete to shallowly radially flattened or quadrate, glabrous to densely sericeous, pappus of multiple bristles or scales, rarely a very reduced crown.

The subtribe contains five genera including *Bebbia* Greene (2 spp.), *Cymophora* B. L. Rob. (5 spp.), *Dyscritothamnus* (2 spp.), *Tetragonotheca* L. (4 spp.), and *Tridax* L. (30 spp.). Most species are distributed in montane, tropical North America with a few species in the north and central Andes of South America.

The Dyscritothamninae are sister to the Melampodiinae (Panero et al. 2001). The monophyly of the Dyscritothamninae and their subtribal relationships are well supported.

Jaegeriinae Panero, **subtribus nov.**-Type: *Jaegeria* Kunth

A Millerieae ceteris, differt characteribus conjuncte: habitu herbaceo, terrestri, palustris vel aquaticus; foliis oppositis, petiolatis

vel sessilis, laminis integris; capitulis ligulatis; phyllariis 1- seriatis; receptaculis paleatis; flosculis radiorum pistillatis; flosculis discorum bisexualibus, corollis actinomorphis, lobis 5; antheris ecaudatis; ramis stylorum sublinearis; cypselae teretibus; pappi absentibus plerumque coroniformibus breviorum.

Annual or perennial herbs, rooting at the nodes. Leaves opposite, sessile to petiolate, blades linear to ovate. Capitulescences axillary or terminal, solitary or of open paniculiform cymes. Capitula radiate. Involucres campanulate to hemispherical, phyllaries in 1 series, subequal, herbaceous with hyaline, ciliate wings wrapping around the ray cypselae, caducous and shed along with cypselas as a unit (perigynia). Receptacles strongly convex to conical, paleate. Ray florets pistillate, fertile, corollas white, white-pink, white-purple, yellow, marcescent, tube short or absent. Disc florets bisexual, fertile, corollas yellow or yellow-green, sometimes whitish gray, lobes 5 rarely 4, tube abruptly narrowed into the throat; stamens 5, anthers yellow, appendages ovate; style branches recurved, apices round to obtuse. Cypselae terete to obscurely angled, clavate, bases tapered, glabrous, shiny black, ray cypselas slightly larger than disc cypselas otherwise equivalent; pappus absent or a minute crown. Base chromosome number, $x = 9$.

Monotypic, *Jaegeria* contains nine species found in the New World tropics with most species concentrated in the highlands of Mexico.

The Jaegeriinae are sister to the clade containing Milleriinae, Desmanthodiinae, Espeletiinae, and Galinsoginae (Panero et al. 2001).

New Combinations in subtribe Ambrosiinae.

Studies of Heliantheae subtribe Ambrosiinae by Miao et al. (1995) support the expansion of the genus *Euphrosyne* DC. to include five species. This new concept of *Euphrosyne* requires the creation of the following combinations:

Euphrosyne acerosa (Nutt.) Panero, **comb. nov.** *Oxytenia acerosa* Nutt., J. Acad. Phil. N. S. 1:172. 1847.

Euphrosyne dealbata (A. Gray) Panero, **comb. nov.** *Iva dealbata* A. Gray, Pl. Wright. 1:104. 1852.

Euphrosyne nevadensis (M. E. Jones) Panero, **comb. nov.** *Iva nevadensis* M. E. Jones, Amer. Natur. 17: 973. 1883.

ACKNOWLEDGMENTS

I wish to thank Billie L. Turner and Blanca León for helpful comments and improving the manuscript.

LITERATURE CITED

Alvarez Fernández, I. 2003. Systematics of Eurasian and North African *Doronicum* (Asteraceae: Senecioneae). Ann. Missouri Bot. Gard. 90: 319-389.

Bremer, K. 1994. Asteraceae: cladistics and classification. Timber Press, Portland, pp. 1-752.

Miao, B., B. L. Turner, and T. J. Mabry. 1995. Systematic implications of chloroplast DNA variation in the subtribe Ambrosiinae (Asteraceae: Heliantheae). Amer. J. Bot. 82: 924-932.

Nesom, G. L. 1994. Subtribal classification of the Astereae (Asteraceae). *Phytologia* 76:193-274.

Nordenstam, B. 1977. Senecioneae and Liabeae-systematic review. In: Heywood, V. H., J. B. Harborne, B. L. Turner (eds), *The Biology and Chemistry of the Compositae 2*. Academic Press. London, pp. 799-830.

- Nordenstam, B.** 1994. Tribe Calenduleae. In: Bremer K. (ed.) *Asteraceae cladistics and classification*, Timber Press. Portland, Oregon, pp. 365-376.
- Panero, J. L., B. G. Baldwin, E. E. Schilling, and J. A. Clevinger.** 2001. Molecular phylogenetic studies of members of tribes Helenieae, Heliantheae, and Eupatorieae (Asteraceae) 3. General systematics and proposed taxonomic changes in current classification. Abstracts of the AIBS 2001 meeting, Albuquerque, New Mexico, p. 132.
- Panero, J. L. and V. A. Funk.** 2002. Toward a phylogenetic subfamilial classification for the Compositae (Asteraceae). *Proc. Biol. Soc. Washington* 115: 909-922.
- Robinson, H.** 1981. A revision of the tribal and subtribal limits of the Heliantheae (Asteraceae). *Smithsonian Contr. Bot.* 51: 1-102.
- Wagstaff, S. J. and I. Breitwieser.** 2002. Phylogenetic relationships of New Zealand Asteraceae inferred from ITS sequences. *Pl. Syst. Evol.* 231: 203-224.

**NEW GENERA AND COMBINATIONS IN BRYACEAE
(BRYALES, MUSCI) FOR NORTH AMERICA**

John R. Spence

National Park Service, Glen Canyon National Recreation Area, P.O.
Box 1507, Page, AZ 86040-1507, U.S.A. Email:
John_Spence@nps.gov

ABSTRACT

The genus *Ptychostomum* Hornsch. is resurrected for species of *Bryum* in sections *Amblyophyllum* and *Caespitibryum*, with 32 well established species found in North America transferred. The section *Leptostomopsis* of *Brachymenium* is raised to generic rank, with the one species found in North America transferred. The genus *Plagiobryoides* is newly described for the neotropical *Bryum incrassatolimbatum*. Two species of *Mielichhoferia* in North America, *M. macrocarpa* and *M. tehamensis*, are transferred to the neotropical genus *Haplodontium*.

Key words: mosses, North America, Bryaceae, *Haplodontium*, *Plagiobryoides*, *Ptychostomum*

Introduction

A considerable amount of new research has been published recently on the Bryaceae, and in particular the genus *Bryum* (Cox & Hedderson 1998, 2003; Cox *et al.* 2000; Pedersen 2002; Pedersen & Hedenas 2002; Pedersen *et al.* 2003; Spence 1987, 1996; Spence & Ramsay 1996, 1999, 2002). *Bryum* is an extremely large and diverse genus, united primarily by plesiomorphic sporophytic characters found throughout the Bryalean alternate-diplolepidous taxa (cf. Pedersen *et al.* 2003). Although there is considerable morphological variation within the genus, no attempts have been made to divide *Bryum* into smaller and presumably more natural groups. To date, the various phylogenetic studies using chloroplast DNA sequences and

morphology have not converged on a particular taxonomic solution, other than indicating that *Bryum* and the related genus *Brachymenium* are polyphyletic.

Although trying to understand the relationships among various proposed genera, species and sections of *Bryum* s.l. seems at times to be hopeless, I believe that it is possible to define natural groups within the genus based on a combination of characters from both generations. Dr. Helen Ramsay and I, while monographing *Bryum* for the Flora of Australia (Spence & Ramsay 2005), have identified groups among the gametophytic diversity in the genus. We have focused primarily on characters of the gametophyte generation, as all work to date suggests that the capsule orientation and peristome features, traditionally used to delimit genera in the family, are not indicative of evolutionary relationships above the species or perhaps sectional levels. We feel that restricting analysis to primarily gametophyte characters provides a valuable and relatively stable basis for the delimitation of natural groups (genera) in the Bryaceae (cf. Zander 1993 for an analogous situation in the Pottiaceae). There are several implications of our work and other studies based on DNA characters, which are discussed below.

Our work clearly supports the presence of two major lineages within *Bryum*, in addition to several smaller groups. Interestingly, these two major groups receive at least partial support from the other DNA and morphological studies cited above (cf. Pedersen et al. 2003). One lineage includes the many traditional *Bryum* species first grouped as the informal "Cernuibryum" by one of us (Spence 1987), along with *Acidodontium*, *Brachymenium* section *Brachymenium*, *Rhodobryum* and *Rosulabryum*. The second lineage includes the numerous small gemmiferous species of *Bryum* in sections *Bryum*, *Apalodictyon*, *Alpiniformia*, and *Doliolidium*, along with *Anomobryum* and *Brachymenium* sect. *Dicranobryum*. We have pointed out that true *Bryum* (e.g., *Bryum argenteum*) is closely related morphologically to *Anomobryum*, and could easily be accommodated in that genus (Spence & Ramsay 2002). However, E.G. Britton lectotypified the genus *Bryum* with *B. argenteum*, which we regard as an unfortunate choice (Spence & Ramsay 1999). *Anomobryum*, and the type of *Bryum* are

sufficiently distinct from other members of the genus to warrant generic status. There are two potential taxonomic implications of this lectotypification if revisions are attempted. The first is that *B. argenteum* and its allies could be treated as a genus closely related to *Anomobryum*, with all other *Bryum* species given a new name. The second is that the two taxa might be combined, in which case a new name would still have to be found for all other *Bryum* species. For Australia, we chose the latter of the two (Spence & Ramsay 2002). We also argued for the conservation of the name *Bryum* with a new type, for which we selected the first species in Hedwig, *B. caespiticium* (Spence & Ramsay 1999). However, the Bryophyte Committee on Nomenclature rejected our proposal (Zijlstra 2002), based in part on a concern for the use of *Bryum caespiticium* as the conserved type, and also because further studies on *Bryum* were pending. Some of these presumed studies have now been either published (e.g., Pedersen et al. 2003) or are cited in Pedersen (2002), and as noted above they do not agree with each. This leaves two choices, continue to treat *Bryum* in a very broad sense, knowing full well that it is polyphyletic, as Ochi (1992) chose to do, or come up with a new classification of the genus based on the evidence to date from all studies, both genetic and morphological. The first approach is unacceptable, so this paper as well as the treatment in Spence & Ramsay (2005) represents the first attempt since Fleischer and Brotherus (1925) to generically re-classify *Bryum*.

Perhaps not surprisingly, the 19th century also witnessed confusion with the exact delimitation and nature of *Bryum*. Hedwig (1801) included a variety of species in his concept of the genus, many of which now reside elsewhere. Fairly soon thereafter both Hornschuch (1822) and Bridel (1826) described new genera long since synonymized under *Bryum*. In Hornschuch's case, it was *Ptychostomum*, described for several species now residing in *Bryum*, including *B. algovicum* and *B. uliginosum*. Bridel published *Cladodium* for the species *B. marratii* and *B. inclinatum* (= *B. amblyodon*). Most of the other species they included in these new genera have since been transferred to *Pohlia*, *Mnium* and other genera.

Validly Published Name	Year	Current Name
<i>C. calophyllum</i> (R. Br.) Brid.	1826	<i>Bryum calophyllum</i>
<i>C. demissum</i> (Hook.) Nees	1836	<i>Plagiobryum demissum</i>
* <i>C. inclinatum</i> (Sw. ex Brid.) Brid.	1826	<i>Bryum amblyodon</i>
<i>C. rhamphostegium</i> Hampe	1865	<i>Acidodontium rhamphostegium</i>
<i>C. socorrense</i> Hampe	1869	<i>Bryum limbatum</i>
<i>C. uliginosum</i> Brid.	1827	<i>Bryum uliginosum</i>

Table 1. Summary of validly published species of *Cladodium* Bridel, year of publication, and currently accepted name. The lectotype species is indicated by an asterisk.

For some reason, these generic names never caught on with later bryologists, and have languished under *Bryum* ever since, probably because the first species of *Bryum* in Hedwig (1801), *B. caespiticium*, is morphologically similar to both *B. algovicum* and *B. amblyodon*. All those species still remaining in *Bryum* that were placed by these two in *Cladodium* and *Ptychostomum* are in the informal group "Cernuibryum" while *B. argenteum* is in the group "Bryum" of Spence (1987).

Because of the above considerations, I propose here to re-instate the genus *Ptychostomum* Hornschuch for those species of *Bryum* in the informal group "Cernuibryum" of Spence (1987). Since all three species first cited by both Bridel and Hornschuch are related, either genus could be used, but *Ptychostomum* has priority over *Cladodium* by four years. Interestingly, my work also suggests two closely related groups within *Ptychostomum*, one corresponding to the species *B. algovicum*, and the second to those species related to *B. uliginosum*. For now I prefer to keep these two groups together, although future work may indicate that they represent distinct but closely related genera. The studies of Cox and Hedderson (2001) and Pedersen *et al.* (2003) both show a well supported clade that consists of species in *Ptychostomum*, although including the species *Bryum donianum*, which based on its gametophyte may be a *Rosulabryum*.

Validly Published Name	Year	Current Name
<i>P. caespiticiu</i> m Brid.	1827	<i>Bryum algovicu</i> m
* <i>P. cernu</i> um (Hedw.) Hornsch.	1822	<i>Bryum uliginosu</i> m
<i>P. compactu</i> m Hornsch.	1822	<i>Bryum algovicu</i> m
<i>P. pendulu</i> m Hornsch.	1822	<i>Bryum algovicu</i> m
<i>P. puchellu</i> m R. Br.	1823	<i>Bryum algovicu</i> m
<i>P. radiculosu</i> m Brid.	1826	<i>Bryum uliginosu</i> m

Table 2. Summary of validly published species of *Ptychostomum* Hornsch., year of publication, and currently accepted name. The lectotype species is indicated by an asterisk.

Tables 1 and 2 list all validly published species in *Cladodium* and *Ptychostomum*. Pfeiffer (1873) lectotypified *Cladodium* with the species *C. inclinatum*, but *Ptychostomum* has not yet been lectotypified. Hornschuch's understanding of the genus was based on certain characters of the sporophyte, primarily the peristome. His essential characters included "*Peristomium duplex: exterius dentibus sedecim erectis, interius membrana hyalia plicata, peristomio externo adhaerens et denta ejusdem inter se conjungens*". The adherence of the endostome to the exostome is a critical character in the circumscription of the genus. The two species Hornschuch included in *Ptychostomum* are currently known as *Bryum algovicum* and *B. uliginosum*. Both these species are characterized by reduced peristomes with the endostome adherent to the exostome. I have selected *P. cernuum* (= *B. uliginosum*) as the lectotype because *P. pendulum* (= *B. algovicum*) is closely related to the type of *Cladodium*, *C. inclinatum*. This selection was made in the interests of preserving both generic names, in case *Cladodium* is also recognized at the generic level at some point in the future. *Ptychostomum cernuum* is in a different section than *C. inclinatum* and is not closely related to it.

Ptychostomum Hornsch., Flora 5, 2: syll. 62, 1822. Lectotype species: *Ptychostomum cernuum* Hornsch., Flora 5, 2: syll. 64, 1822. In addition, Hornschuch included the species currently known as *Bryum algovicum* (Brid.) B.S.G. in the genus as *Ptychostomum pendulum* Hornsch., Flora 5, 2: syll 62, 1822.

The following 27 species found in North America are also transferred to the genus.

Ptychostomum archangelicum (B.S.G.) J.R. Spence, **comb. nov.**
Basionym: *Bryum archangelicum* B.S.G., Bryol. Eur. 4: 153, 1846.

Ptychostomum arcticum (R. Br.) J.R. Spence, **comb. nov.**
Basionym: *Pohlia arctica* R. Br., Chlor. Melvill. 38. 1823.

Ptychostomum badium (Brid.) J.R. Spence, **comb. nov.**
Basionym: *Bryum caespiticium* var. *badium* Brid., Bryol. Univ. 1: 850. 1827.

Ptychostomum bimum (Schreb.) J.R. Spence, **comb. nov.**
Basionym: *Mnium bimum* Schreb., Bot. Zeit. (Regensburg) 1: 79. 1802.

Ptychostomum calophyllum (R. Br.) J.R. Spence, **comb. nov.**
Basionym: *Bryum calophyllum* R. Br., Chlor. Melvill. 38. 1823.
Synonym: *Cladodium calophyllum* (R. Br.) Brid., Bryol. Univ. 1: 620. 1826.

Ptychostomum cryophilum (Mårt.) J.R. Spence, **comb. nov.**
Basionym: *Bryum cryophilum* Mårt., K.V.A. Afh. Natursk. 15: 183, 1956. Nom. nov. *B. obtusifolium* Lindb., Ofvers. Forh. Konsch. Svenka Vetensk.-Akad. 23: 544. 1866; not *B. obtusifolium* Brid., Muscol. Recent 2(3): 52. 1803.

Ptychostomum curvatum (Kaur. & Arn.) J.R. Spence, **comb. nov.**
Basionym: *Bryum curvatum* Kaur. & Arn., Bot. Not. 67. 1897.

Ptychostomum cyclophyllum (Schwaegr.) J.R. Spence, **comb. nov.**
Basionym: *Mnium cyclophyllum* Schwaegr. Sp. Musc. Suppl. 2, 2(2): 160, pl. 194. 1827.

- Ptychostomum inclinatum* (C. Muell.) J.R. Spence, **comb. nov.**
Basionym: *Cladodium inclinatum* (Sw. ex Brid.) Brid., Bryol. Univ. 1: 620, 1826.
- Ptychostomum intermedium* (Brid.) J.R. Spence, **comb. nov.**
Basionym: *Pohlia intermedia* Brid., Muscol. Recent 2(3): 144, pl. 2, f. 12. 1803.
- Ptychostomum knowltonii* (Barnes) J.R. Spence, **comb. nov.**
Basionym: *Bryum knowltonii* Barnes, Bot. Gaz. 14: 44, 1889.
- Ptychostomum lonchocaulon* (C. Muell.) J.R. Spence, **comb. nov.**
Basionym: *Bryum lonchocaulon* C. Muell., Flora 2(6): 90, 1819.
- Ptychostomum longisetum* (Bland. ex Schwaegr.) J.R. Spence, **comb. nov.** Basionym: *Bryum longisetum* Bland. ex Schwaegr., Spec. Frond. Musc. Suppl. 1, 2: 105, pl. 74, 1816.
- Ptychostomum marratii* (Hook. & Wils.) J.R. Spence, **comb. nov.**
Basionym: *Bryum marratii* Hook. & Wils., Bryol. Brit., p. xi (add.), pl. XXXIb, 1855.
- Ptychostomum meesioides* (Kindb.) J.R. Spence, **comb. nov.**
Basionym: *Bryum meesioides* Kindb., Bull. Torrey Bot. Club 16: 95, 1889.
- Ptychostomum neodamense* (Itzigs.) J.R. Spence, **comb. nov.**
Basionym: *Bryum neodamense* Itzigs. in C. Muell., Syn. Musc. Frond. 1: 258. 1848.
- Ptychostomum pallens* (Sw.) J.R. Spence, **comb. nov.**
Basionym: *Bryum pallens* Sw., Monthl. Rev. Lond. 34: 538. 1801.
- Ptychostomum pallescens* (Schleich. ex Schwaegr.) J.R. Spence, **comb. nov.** Basionym: *Bryum pallescens* Schleich. ex Schwaegr., Sp. Musc. Suppl. 1, 2: 107, pl. 75. 1816.

Ptychostomum purpurascens (R. Br.) J.R. Spence, **comb. nov.**

Basionym: *Pohlia purpurascens* R. Br., Clor. Melvill. 39. 1823.

Ptychostomum reedii (Robins.) J.R. Spence, **comb. nov.**

Basionym: *Bryum reedii* Robins., Bryol. 69: 107, 1966.

Ptychostomum rutilans (Brid.) J.R. Spence, **comb. nov.**

Basionym: *Bryum rutilans* Brid., Bryol. Univ. 1: 684. 1826.

Ptychostomum salinum (Hag. ex Limpr.) J.R. Spence, **comb. nov.**

Basionym: *Bryum salinum* Hag. ex Limpr. Laubm. Deutschl. 2: 334. 1892.

Ptychostomum schleicheri (Schwaegr.) J.R. Spence, **comb. nov.**

Basionym: *Bryum schleicheri* Schwaegr., Sp. Musc. Frond. Suppl. 1, 2: 113, pl. 73 p.p. 1816.

Ptychostomum turbinatum (Hedw.) J.R. Spence, **comb. nov.**

Basionym: *Mnium turbinatum* Hedw., Sp. Musc. Frond. 191. 1801.

Ptychostomum warneum (Röhl.) J.R. Spence, **comb. nov.**

Basionym: *Mnium caespitium* var. *warneum* Röhl., Deutsch. Fl. (ed. 2), Kryptog. Gew. 3: 95. 1813.

Ptychostomum weigelii (Spreng.) J.R. Spence, **comb. nov.**

Basionym: *Bryum weigelii* Spreng., Mant. Prim. Fl. Hals. 55. 1807.

Ptychostomum wrightii (Sull. & Lesq.) J.R. Spence, **comb. nov.**

Basionym: *Bryum wrightii* Sull. & Lesq., Proc. Amer. Acad. Arts Sci. 4: 278. 1860.

Several additional species of *Bryum* that may belong in *Ptychostomum* have been reported from North America. Most are poorly known Arctic species, and more work is needed to determine their status. These are: *B. acutiforme* Limpr., *B. axel-blyttii* Philib., *B.*

bryoides (R. Br.) Ångstr., *B. brachyneuron* Kindb., *B. hagenii* Limpr., *B. nitidulum* Lindb., *B. subneodamense* Kindb., and *B. teres* Lindb.

The following three species of *Bryum* also occur in Australia, and are transferred for the Flora of Australia (Spence & Ramsay 2005).

Ptychostomum angustifolium (Brid.) J.R. Spence & H.P. Ramsay, **comb. nov.** Basionym: *Bryum angustifolium* Brid., Musc. Recent. Suppl. 3: 31, 1817. Synonym: *Bryum caespiticium* Hedw., Sp. Musc. Frond., 1801, not *Ptychostomum caespiticium* Brid., Bryol. Univ. 1: 837, 1827.

Since the combination *Ptychostomum caespiticium* has priority as a synonym of *Ptychostomum pendulum* a new name is needed for the species known as *B. caespiticium* Hedw. The first name that still remains valid within that species is *B. angustifolium* Bridel.

Ptychostomum creberrimum (Taylor) J.R. Spence & H.P. Ramsay, **comb. nov.** Basionym: *Bryum creberrimum* Taylor, Lond. J. Bot. 5: 54. 1846.

Ptychostomum pseudotriquetrum (Hedw.) J.R. Spence & H.P. Ramsay, **comb. nov.** Basionym: *Mnium pseudotriquetrum* (Hedw.) Schwaegr., Spec. Musc. Suppl. 1, 2: 110. 1816.

Leptostomopsis (C. Muell.) J.R. Spence & H.P. Ramsay, **stat. nov.** Lectotype: *L. systylium* (C. Muell.) J.R. Spence & H.P. Ramsay, **comb. nov.** Basionym: *Bryum systylium* C. Muell., Syn. Musc. Frond. 1: 320. 1848.

The species in section *Leptostomopsis* of *Brachymenium* comprise a distinctive group that superficially resembles *Leptostomum*. They are characterized by densely compact cushions on bark or rock, dense lamina areolation, a long hyaline spinose hairpoint, and erect capsules with reduced peristomes. In an earlier paper (Spence 1996) I first suggested that the section may represent a distinct genus. The work of Cox & Hedderson (2003) and Pedersen *et al.* (2003) support this,

suggesting that the group is basal to the remainder of the Bryaceae, and only distantly related to the rest of *Brachymenium* as well as *Bryum*. This section is sufficiently distinct from other members of the Bryaceae in both genetic and morphological characters to warrant generic rank. There are about 8-10 species, pantropical and southern hemispheric in distribution in drier tropical and subtropical regions. One species, the type, is known from southern areas of the U.S.A.

Plagiobryoides J.R. Spence, **gen. nov.**

Caules uniformiter foliati. Folia ovata, in statu sicco contorta, areolatione laminali subheterogenea, cellulis distalibus brevibus irregulariter subquadratis vel brevi-rhombicis, in parte mediana atque proximali cellulis paulo longi-rhombicis, marginibus distincte limbatis valde bi-vel multistratosis, costa in sectione transversali cellulis ducum in strato unico adaxialiter supra stratum stereidarum bene effectum sitis praedita. Gemmae asexuales nullae. Plantae dioicae. Capsulae subzygomorphae, ore obliquo, inclinatae vel subrectae; peristomium diplolepidum, segmentis endostomialibus longitudine aequis exostomio, ciliis imperfectis vel nullis. Sporae parvae, 10-15 μ m.

Stems elongate, to 30 mm, simple, rarely branched, in transverse section with weakly developed central strand, with large thin-walled cells exterior, and somewhat smaller and thicker-walled peripheral cells; evenly foliate; rhizoids abundant, red-brown, papillose. **Leaves** pink, red to brown, ovate, keeled, contorted and twisted when dry, spreading when wet, concave, 1.0-2.5 mm long, apex acute to obtuse, moderately to strongly and longly decurrent; costa broad, strong, not reaching apex to rarely percurrent, in cross-section with enlarged guide-cell like layer, one to two-layered, ventral to a well developed stereid band, sometimes guide-like cells lacking; lamina areolation somewhat heterogenous, thin-walled, with short irregularly subquadrate to short-rhomboidal cells distally and somewhat longer irregularly rhomboidal cells in median and proximal part, typically, 60-100 μ m x 12-30 μ m wide, margins with strongly differentiated border, bi- to multistratose, of thick-walled cells. **Specialized asexual gemmae** lacking. **Sexual condition** dioicous. **Seta** slender, flexuose to

bent near base. **Capsules** suberect, somewhat zygomorphic and asymmetric with oblique mouth, apophysis slender, well differentiated, operculum conic, without apiculus, peristome double, exostome teeth lanceolate, somewhat united at base, yellowish, basal membrane hyaline, high, segments slightly keeled, with narrow perforations or slits, the same length as exostome, cilia rudimentary or lacking. **Spores** small, 11-14 μm (description of sporophyte from Ochi and Salazar-Allen 1990).

Type species: *Plagiobryoides incrassatolimбата* (Card.) J.R. Spence, **comb. nov.** Basionym: *Bryum incrassatolimbatum* Card., Rev. Bryol. 36: 114, 1909.

Plagiobryoides incrassatolimбата is a distinctive species that cannot be confused with any other member of the Bryaceae. The extremely lax lamina areolation and often multistratose limbidium are diagnostic. Remarkable for the family, lamina cells near the leaf tip are often nearly isodiametric to subquadrate. The capsule is similar to that found in *Plagiobryum* and its allies in the broad sense, including *Bryum cellulare* and related species. This distinctive plant is found on wet calcareous rock and is a Neotropical species, distributed from the southwestern U.S.A. through Mexico and Central America.

Haplodontium Hampe

Haplodontium consists of species with lateral sporophytes and an extremely reduced peristome, typically of one layer. Shaw (1985) transferred all species in the genus to *Mielichhoferia* Hornsch. However, the recent work using DNA analysis (Cox and Hedderson 2003; Cox *et al.* 2000; Pedersen 2002; Pedersen and Hedenas 2002; Pedersen *et al.* 2003) indicates that the type of *Mielichhoferia*, *M. mielichhoferiana*, is more closely related to *Pohlia*, while many other species originally in *Haplodontium* are deeply nested with the Bryaceae. These include the two North American species *M. macrocarpa* and *M. tehamensis*, which are gametophytically very close to other species of *Haplodontium* and *Plagiobryum*, and very similar to

the type of the genus, *H. megalocarpum* Arnott. These two species are thus transferred to a resurrected *Haplodontium* as:

Haplodontium macrocarpum (Hook. ex Drumm.) J.R. Spence, **comb. nov.** Basionym: *Weissia macrocarpa* Hook. ex Drumm. Musci Amer., Brit. N. Amer. 74. 1828.

Haplodontium tehamense (Showers) J.R. Spence, **comb. nov.** Basionym: *Mielichhoferia tehamensis* Showers, Bryol. 83: 365, 1980.

Acknowledgments

This work was supported in part by a grant from the Flora of North America Association. The Missouri Botanical Gardens provided office space. Thanks are due to Richard Zander, Marshall Crosby and Bruce Allen for their support during my stay. I am grateful to Patricia Eckel for providing the Latin diagnoses. Marshall Crosby and Richard Zander kindly reviewed an early draft of this work.

Literature Cited

- Bridel, S.E. 1826. *Bryologia Universa*. Vol. 1. Leipzig.
- Brotherus, V.F. 1925. Musci (Laubmoose). 2. Hälfte. In: Engler, A & K. Prantl (eds), *Die Natürlichen Pflanzenfamilien*. Leipzig.
- Cox, C.J. and T.A.J. Hedderson. 1998. Phylogenetic relationships among the ciliate arthrodontous mosses: evidence from chloroplast and nuclear DNA sequences. *Plant Syst. Evol.* 215: 119-139.
- _____. 2003. Phylogenetic relationships within the moss family Bryaceae based on chloroplast DNA evidence. *J. Bryol.* 25: 31-40.

- Cox, C.J., B. Goffinet, A.E. Newton, A.J. Shaw and T.A.J. Hedderson.** 2000. Phylogenetic relationships among the diplolepidous-alternate mosses (Bryidae) inferred from nuclear and chloroplast DNA sequences. *Bryol.* 103: 224-241.
- Hedwig, J.** 1801. *Species muscorum frondosorum descriptae*. Leipzig.
- Hornschuch, F.** 1826. *Flora* 5, 2: Syll. 62. 1822.
- Ochi, H.** 1992. A revised infrageneric classification of the genus *Bryum* and related genera (Bryaceae, Musci). *Bryobrothera* 1: 231-244.
- Ochi, H. and N. Salazar-Allen.** 1990. *Bryum incrassatolimbatum* new to Panama, with first description of its sporophyte. *Bryol.* 93: 286-287.
- Pedersen, N.** 2000. A cladistic overview of the Bryaceae (Musci) based on morphological and anatomical data and with emphasis on the genus *Bryum*. *J. Bryol.* 22: 193-206.
- Pedersen, N.** 2002. Phylogeny and taxonomy of the acrocarpous moss family Bryaceae with emphasis on the genus *Bryum* Hedwig. Botaniska Institutionen, Stockholms Universitet, Stockholm, Sweden.
- Pedersen, N. and L. Hedenäs.** 2002. Phylogenetic relationships between *Bryum* and supposedly related genera. *J. Bryol.* 24: 277-289.
- Pfeiffer, L.** 1873. *Nomenclatur Botanicus*. I(I). Cassellis, sumptibus Theodori Fischeri, vi + 808 pp.
- Pedersen, N., C.J. Cox, and L. Hedenäs.** 2003. Phylogeny of the moss family Bryaceae inferred from chloroplast DNA sequences and morphology. *Syst. Bot.* 28: 471-482.

Shaw, A.J. 1985. Nomenclatural changes in the Bryaceae subfamily Mielichhoferioideae. *Bryol.* 88: 28-30.

Spence, J.R. 1987. A proposed reclassification of *Bryum*, *Anomobryum*, and *Brachymenium* (Musci, Bryaceae). *J. Bryol.* 14: 659-676.

Spence, J.R. 1996. *Rosulabryum* genus novum (Bryaceae). *Bryol.* 99: 221-225.

Spence, J.R. and **H.P. Ramsay.** 1996. New and interesting species of *Bryum* from Australia. *J. Adelaide Bot. Gard.* 17: 107-118.

Spence, J.R. and **H.P. Ramsay.** 1999. Proposal to conserve the name *Bryum* (Musci, Bryaceae) with a conserved type. *Taxon* 48: 827-828.

Spence, J.R. and **H.P. Ramsay.** 2002. The genus *Anomobryum* Schimp. (Bryopsida, Bryaceae) in Australia. *Telopea* 9: 777-792.

Spence, J.R. and **H.P. Ramsay.** 2005. Bryaceae. Flora of Australia, Vol. 51. Government Printing Service, Canberra (in press).

Zander, R.H. 1993. Genera of the Pottiaceae: Mosses of harsh environments. *Bull. Buffalo Soc. Nat. Sci.* 32: 1-378.

Zijlstra, G. (sec.). 2002. Report of the committee for bryophytes: 7. *Taxon* 51: 793-794.

**KEYS TO THE FLORA OF FLORIDA -- 12, *RUBUS*
(ROSACEAE)**

Daniel B. Ward

Department of Botany, University of Florida
Gainesville, Florida 32611, U.S.A.

ABSTRACT

The genus *Rubus* (Rosaceae) is represented in Florida by 4 species: *R. flagellaris* Willd. is found in the state only in the Florida panhandle; *R. argutus* Link, *R. cuneifolius* Pursh, and *R. trivialis* Michx., are widely distributed, although rare or absent in South Florida. Specific names based upon 15 Florida *Rubus* types are assigned to these taxa. An extended commentary is provided in support of the thesis that the great majority of specific names in *Rubus* have been given to agamospermic segregates that, although morphologically distinguishable by the specialist, are too subtly characterized to be usefully employed by the working taxonomist, and that a less precise classificatory structure centered upon the sections into which the genus is divisible, is to be preferred. An amplified key is given to the Florida species.

KEY WORDS: *Rubus*, Rosaceae, Florida flora.

"What is the blackberry situation at this hour? It is indeed an unhappy heritage. Where angels had feared to tread the ground has been traversed, and so unforbearingly, notwithstanding the briers, that not any semblance of a pathway has been suffered to exist." E. P. Bicknell (Bull. Torrey Bot. Club 37:393. 1910)

Alongside *Crataegus*, *Rubus* (Rosaceae) shares the unenviable reputation of being among the most intractable of North American

genera in terms of the ease by which a specimen or even an entire plant may be assigned to its correct species. The multiplicity of specific epithets found in floristic works, together with the subtle morphological differences by which the various entities are separated, has presented the user with an excessive number of alternatives and little prospect that his choice will be correct. Reproducibility -- the bedrock of scientific enquiry -- in this case the probability that independent observers of competent background will assign the same name to a given *Rubus* clone, has been replaced by a quicksand of individual interpretation.

This imprecision of identification has produced in the minds of many workers distaste for the genus *Rubus* and a disinclination to spend time and attention in the resolution of its problems. The hiatus has been filled by a few dedicated and exceedingly patient students whose very expertise has resulted in the recognition of ever more taxa and a further widening of the barrier to conventional enquiry.

A casual observer whose interests lie primarily in the identification of plants of a limited area may not fully appreciate the explosive proliferation in the names assigned to *Rubus* in eastern North America. Until the last years of the 19th century less than a dozen names were of common usage, and included the wholly distinct raspberries, flowering raspberries, and cloud-berries. The blackberries, where most of the taxonomic difficulties lie, received no serious examination until W. H. Blanchard studied them in the field from Newfoundland to Florida and west to the geographic limit of the group. By 1911, although Blanchard had concluded that "eight species include the great bulk of our blackberries, perhaps ninety percent of them," he felt obligated to recognize and name 36 additional specific entities (Bailey, *Gentes Herbarum* 1:142. 1923).

Other authors then saw need to name still other species. M. L. Fernald, although he accepted many of Blanchard's names, gave 24 additional specific epithets to North American blackberries (Gray Herbarium index). P. A. Rydberg described a further 24, H. A. and T. Davis described 9 more, while still others were described and named

by T. C. Porter, N. L. Britton, W. W. Ashe, J. K. Small, and L. H. Shinnars.

But the author of greatest importance, whose intensive field studies and voluminous publications on *Rubus* span more than half a century, was L. H. Bailey. His interest in *Rubus* grew slowly, with a single specific epithet published in 1898 and a second in 1902. By 1934 Bailey had published a total of 52 specific names. His perceptions by then were acutely sensitized, and a profusion of new names appeared: 42 in 1941, 79 in 1943, 40 in 1944, 74 in 1945, and 81 in 1947. With a few additional names in following years, Bailey was responsible for the description, the naming, and in nearly all cases the illustration of a total of 383 species of *Rubus*.

Yet Bailey did not feel that the reservoir of undescribed species was near depletion. His compendious Species Batorum (Gentes Herbarum 5:1-932. 1941-45) provided coverage of the 390 species of *Rubus* then recognized by him in North America. In the next two years he accumulated a further 76 species, as described and illustrated in his supplementary Studies in *Rubus* (Gentes Herbarum 7:193-349. 1947). But the 466 species he thus recognized were no more than, in Bailey's opinion, "nearly or quite one-half the number of species native on the continent."

Although North America is, in Bailey's words, "probably...the most fertile area on the globe for *Rubus*," Europe has fared no less well in terms of the number of specific epithets applied to the genus. Perhaps reflecting the greater density of botanists more than the European subcontinent's relatively impoverished vascular flora, the basic texts of Europe treat large numbers of minutely distinguished *Rubus* species. The volume of recognized names has compelled a stratagem for their handling, by the segregation of species into categories, or levels of importance, with only the principal species or "circle-species" given full treatment. In central Europe, H. Huber (in Hegi, Flora von Mitteleuropa IV/2A:274-411. 1964-66) recognized 33 basic species and 252 subordinate species; these latter were described, but in different type size and without inclusion in the main key to

species. In the most comprehensive modern European floristic treatment, Y. Heslop-Harrison (*Flora Europaea* 2:7-25, 1968) acknowledged 75 species of *Rubus*, of which 66 were "circle-species" representative of groups which contained an additional 374 undescribed and unkeyed related specific names. Since there is no provision in the International Code, nor accepted systematic dogma, for the existence of species of more than one level of biological importance, the European stylistic practice, though maintaining the semblance of a workable structure, is as yet unexplored in its more fundamental implications.

The redundancy of specific epithets in *Rubus*, both in Europe and America, has not failed to bring forth skeptics who questioned the biological significance of the named entities, even their very existence and the motivation of their authors. The American E. P. Bicknell, himself the author of 70 obscurely defined species in *Sisyrinchium*, expressed his unease at Blanchard's many *Rubus* names with an article plaintively entitled "Have we enough New England blackberries?" (*Bull. Torrey Bot. Club* 37:393-403, 1910). Defense of the reality of the new entities has rested largely with L. H. Bailey who provided a rationale with each of his major treatments of the genus. At no time was Bailey unaware of the unconventional image that his many species produced in the minds of classical systematists. He remarked in 1923 (*Gentes Herbarum* 1:143), "In *Rubus*...it is not possible always to apply the formal species concept of ante-evolutionary days with either precision or satisfaction." In 1941 (*G. H.* 5:18) he said, "The reader may suppose that I have split the species finely. The opposite is the truth. I could have described any number more if I had cared to pursue a separatist course." In 1943 (*G. H.* 5:233) he commented, "With so many kinds now separated, the reader may wonder whether every colony is not a distinct species. This is a natural reaction..." He cautioned in 1944 (*G. H.* 5:508), "...persons not critical in *Rubus* will have little success with either pictures or specimens. The mind must first be free of notions and then the eye must be able to discriminate." And he rested his arguments in 1947 (*G. H.* 7:194) with the defense, "I have never made a species; I have only recognized, named and described them."

Bailey gave repeated attention to the supposition that the many closely defined species recognized by him were the product of prolific hybridization among a limited number of true species. Bicknell had been insistent that the entities named by Blanchard could be accounted for as hybrids between no more than 11 species. Unwillingness to accept such an explanation was a theme that persisted through all of Bailey's works. His hostility to what he considered a glib and superficial interpretation was scarcely concealed (G. H. 5:6. 1941): "Early in the present century began the singular hybridity postulate in *Rubus* work, whereby hybrids were freely assumed from herbarium specimens so fragmentary that not even the species themselves can be determined; thereby was the fear of making new species escaped and the difficulty of understanding the plants was assuaged." He did not deny the possibility of natural hybridity in the genus, but challenged that its existence had yet to be proved and insisted that the entities described by him were readily recognized by a person of observant eye and sufficient field experience.

Yet even as students of *Rubus* determinedly pursued the self-immolating course of recognizing and naming a seemingly endless series of dubious new species, and as Bailey shrugged off the shallow proposals that nothing more was involved than a massive hybrid swarm, contemporaries in the fields of embryology and cytogenetics were disclosing a framework of understanding on which a workable taxonomic structure could be hung. This was the discovery that reproduction by seed was a less than universally sexual process. In Europe, influenced particularly by the work and writings of A. Gustaffson, the concept came to be held that many genera of vascular plants display the phenomenon of agamospermy, or reproduction by seeds but without fertilization, as a special case within the general process of asexual reproduction or apomixis. *Rubus* was among the numerous genera in which agamospermic reproduction was suspected or identified.

In North America, and particularly among classical systematists, such a concept was not quickly applied or perhaps understood. Bailey

seems never to have given written expression of awareness that the individuals constituting many of his species might be of asexual origin, although his activities were indeed largely prior to widespread acceptance of the agamospermous pathway. He referred to the process only once, by indirect inclusion (G. H. 7:197. 1947): "I am asked for proof or at least for opinion that my novelties are not hybrids or apomicts or other irresponsibilities...of course no man has such proofs...."

But Bailey was nonetheless in search of such proofs, whichever way they might point. In 1944 he had begun the support and encouragement of John Einset in New York State, in his study of the cytology and embryology of various *Rubus* clones. By 1951 (Amer. J. Botany. 38:768-772) Einset was able to publish the first satisfactory evidence that in North America *Rubus* there operated certain apomictic phenomena that had previously been demonstrated only in Old World species.

Einset worked with 24 wild selections of *Rubus* which he brought into cultivation and which Bailey identified. He found the chromosome numbers to form a regular series of multiples of the basic 7, ranging from 14 through 63 in the species studied, with only a single clone having an aneuploid number outside this series. Triploids, with the somatic number of 21, formed the most common grouping, representing a third of the clones examined. As had European workers previously, he found that pollination was necessary for seed production. By crossing clones with different chromosome numbers and by counting the chromosomes of the resultant seedlings, if the seedling count matched that of the seed parent and differed from that of the pollen parent he could assume that agamospermy was present.

Einset's work strongly supports the assumption of apomixis in the American blackberries. When the chromosome numbers of the seed parent and the pollen parent were different, a high proportion of the seedlings (80 per cent in the case of tetraploid seed parents, 96 per cent with triploid seed parents) gave the same chromosome count as that of the seed parent. Had there been reduction of chromosome number with

a chromosomal contribution from each parent, as in sexual reproduction, intermediate counts would have been obtained with much greater frequency. Einset could only conclude that a high percentage of his *Rubus* progeny resulted from the parthenogenetic development of unreduced eggs.

The mechanics of reproduction in *Rubus* thus became clearer. Blackberries spread by vegetative means, with runners and rooting shoot-tips increasing the extent of the colony. Seeds are also formed, and serve as a means of dissemination across natural barriers and over distance. At times these seeds are produced by familiar sexual processes, and generate individuals that show the minute differences characteristic of genetic recombination. Perhaps also disparate individuals combine at times, to yield hybrids which differ from the offspring of conventional sexual reproduction only in the magnitude of their variability.

But in *Rubus* a less familiar generative mode is also present, and may well form the dominant reproductive pattern within the genus. This is the agamospermous pathway, in particular the pollination-requiring variant known as pseudogamy. The progeny thus produced, while simulating the offspring of sexual reproduction, are identical in genetic composition and essentially identical in morphology to their maternal parent. By the agamospermous replication of these individuals in their turn, large numbers of clones may be generated. With seed-eating birds as vectors, their distribution will be limited only by factors of habitat availability and physiologic adaptability.

A student inexperienced in *Rubus* who detects one of these agamospermic multi-clonal series is compelled to view it as he would an undescribed species. He finds the plants to have a coherent distribution, occur in predictable habitats, require pollination and reproduce by seed, and vary morphologically within a narrow range. His novelty is recognizable to him, and in almost every regard possesses the criteria that he associates with conventional species. It is perhaps inevitable that he should wish to bring legitimacy to his

discovery by publishing its description and by coining a new name to serve as its label.

And thus conflict arises in the study of *Rubus*. On the one hand is the insistence of close students of the genus, most of them of unquestioned taxonomic competence and extensive field experience, that they can recognize entities that are uniform, at times in many colonies distributed over hundreds of miles. On the other hand is the practical inability of less practiced workers to distinguish reliably among entities so very numerous that only the finite energies and lifetimes of their human identifiers appear to restrict their numbers.

This conflict has no elegant solution. The organisms themselves create the hierarchy to be described, and it is neither linear nor consistent in its structure. The series of equivalent units of a sexual system does not have a parallel in an agamospermic complex. No useful purpose is achieved by insisting that apomictic microspecies can be recognized with sufficient study, for they can neither be keyed by the specialist nor identified by the workaday taxonomist. A coarser, less precise classificatory structure seems to be the only feasible approach.

Thus one is led to a system that recognizes as species only major groupings of the genus *Rubus*. In the blackberries only one species appears usefully recognized in each section. In North America, Bailey (*Gentes Herbarum* 5:45-46. 1941) acknowledged ten sections in the true blackberries; the present scenario, if rigorously followed, would reduce the North American blackberries to this number of species. Among the raspberries, flowering raspberries, and cloud-berries the same degree of reduction is perhaps unwarranted, for it is not clear that the agamospermic process is as dominant there. But the blackberries, at least, appear more easily handled as a few aggregations of related forms than as constellations of numerous related microspecies.

Such an approach implies the assumption that each aggregation consists of a single basic species and its derived apomicts. Extensive work on *Rubus* in Europe, much of it by Gustafsson (see V. Grant,

Plant Speciation 325-331. 1971), has shown that diploid sexual species form the phylogenetic foundation of the European blackberry flora. A similar evolutionary origin may reasonably be attributed to North American species. The ancestral diploids, as deduced from the European example, may indeed no longer be extant, being represented in modern times only by their polyploid pseudogamous offspring. Further, certain aggregations of apomicts appear derived, not from a single diploid, but from hybrids formed by crossings in distant times between two of the diploid species. One must therefore not expect that the natural groupings of microspecies will necessarily be demarked by the presence of a sexual diploid, nor that all clones will fall within the larger aggregations, however they may be arranged.

Certain blackberry clones have been selected from the wild, and additional forms will undoubtedly be selected in the future, that possess characteristics of fruit, of flowers, or of vigor superior to those of the general population from which they come. These selections may have been recognized and named by previous students of the genus, or they may as yet be unnamed. The horticultural and other commercial importance of the selection may be such that a formal name is desired. In such situations, rather than a formal botanical binomial, the use of the flexible cultivar nomenclature would seem preferable. As examples, *Rubus trivialis* Michx. 'Marvel' (or *Rubus trivialis* cv. Marvel) and *Rubus trivialis* 'Okeechobee' are fully adequate replacements for *Rubus mirus* Bailey and *Rubus okeechobeus* Bailey, respectively. *Rubus flagellaris* Willd. 'Almus' and *R. flagellaris* 'Foster Thornless' are among other listed cultivar names.

Florida does not have a complicated blackberry flora. Only four of the ten sections recognized by Bailey are represented within the state: Arguti Rydb. (=Frondosi Bailey, Floridi Bailey), Cuneifolii Bailey, Flagellares Bailey (=Procumbentes Rydb., Tholiformes Fern.), and Verotriviales Bailey (=Persistentes Fern., Triviales Rydb.). Within these sections fall all of the 15 *Rubus* specific names based upon Florida types (1 by Rydberg, 14 by Bailey), as well as the uncounted but numerous names typified elsewhere but applied to Florida blackberries. Among these other names are four that typify the above

four sections and should be used to denote the major aggregations of *Rubus* as found in Florida: *Rubus argutus* Link, *Rubus cuneifolius* Pursh, *Rubus flagellaris* Willd., and *Rubus trivialis* Michx.

Rubus L. Blackberries¹

1. Stems trailing or supported by low vegetation, elongate (to 2 m.), densely set with both stout prickles and numerous stiff bristles, usually mahogany red; leaves persistent throughout winter, subcoriaceous, leaflets glabrous, dark glossy; flowers usually solitary, on erect pedicels; petals white. Prickly trailing shrub. Thickets, open woodlands, brushy fields. Throughout; common. Spring. [*R. agilis* Bailey; *R. continentalis* Bailey; *R. lucidus* Rydb.; *R. mirus* Bailey; *R. okeechobeus* Bailey]

SOUTHERN DEWBERRY. ***Rubus trivialis* Michx.**

1. Stems erect, arching at tips, or declining and rooting, with prickles but with few or no slender bristles; leaves deciduous, thin, leaflets glabrous or densely pubescent below; flowers mostly in 3-several-flowered panicles.
2. Stems erect when young but soon arching and declining, often rooting at tips; prickles weak, sparse, often almost lacking; petals white. Prickly arching shrub, to 0.8 m. Mesic woodlands, clearings, old fields. Panhandle (east to Madison County); infrequent. Spring. [*Rubus enslenii* Tratt]

NORTHERN DEWBERRY. ***Rubus flagellaris* Willd.**

2. Stems remaining erect, although often arching toward tip, not rooting; prickles stout, numerous, recurved.

¹The "amplified key" format employed here is designed to present in compact form the basic morphological framework of a conventional dichotomous key, as well as data on habitat, range, and frequency. This paper is a continuation of a series begun in the 1970s (vide *Phytologia* 35:404-413. 1977). I wish to thank David W. Hall and Kent D. Perkins for constructively reviewing the manuscript.

3. Leaflets ovate to oblong, glabrous or nearly so; stems commonly to 2 m. (to 8 m., when supported by surrounding vegetation); panicle often several-flowered; petals white; fruits sweet. Prickly arching shrub. Moist to dry thickets, pond margins, swamps. Throughout panhandle and north Florida, south to mid-peninsula (Highlands, Okeechobee counties); common. Spring. [*R. betulifolius* Small; *R. floridus* Tratt; *R. harperi* Bailey; *R. penetrans* Bailey; *R. rhodophyllus* Rydb. in Small; *R. tallahasseeanus* Bailey; *R. ucetanus* Bailey; *R. zoeae* Bailey]

HIGHBUSH BLACKBERRY. **Rubus argutus** Link

3. Leaflets obovate, densely gray-pubescent beneath; stems usually less than 1 m.; panicle usually 1-3-flowered; petals white; fruits bland. Prickly arching shrub. Dry sands, old fields, disturbed areas. Nearly throughout (excl. south peninsula); common. Spring. [*R. audax* Bailey; *R. chapmanii* Bailey; *R. floridensis* Bailey; *R. humei* Bailey; *R. inferior* Bailey]

SAND BLACKBERRY. **Rubus cuneifolius** Pursh

**A NEW SPECIES OF *SEYMERIA* (SCROPHULARIACEAE)
FROM OAXACA, MEXICO**

B. L. Turner

Plant Resources Center, University of Texas, Austin 78712-0471, USA

ABSTRACT

Seymeria mazatecana B. L. Turner, **sp. nov.**, is described from northeastern Oaxaca, Mexico. It is closely related to *S. decurva* but is readily distinguished from that taxon by vestiture and shape of its mature capsules. A photograph of the holotype is provided.

KEY WORDS: Scrophulariaceae, *Seymeria*, Mexico, Oaxaca.

Routine identification of Mexican plants has revealed the following novelty:

***Seymeria mazatecana* B. L. Turner, **sp. nov.** Fig. 1**

Similis *Seymeriae decurvae* Benth. ex DC., sed plantae herbae compactae, caules dense villosi, et capsulae late ovoideae (vice capsularum ellipsoidearum) sunt.

Compact perennial herbs 15-30 cm high, drying black. Stems densely villous with multicellular spreading or reflexed hairs 0.5-1.0 mm long. Leaves pinnately lobed, those at mid-stem mostly 6-12 mm long, 5-8 mm wide, pubescent with both short hispidulous hairs and capitate-glandular hairs, interspersed among these a smattering of longer crinkly hairs such as occur on the stems. Inflorescence a terminal leafy raceme up to 12 cm long bearing 10-20 flowers. Pedicels 8-11 mm long. Calices 6-7 mm long having 5-8 irregular lobes 2-4 mm long. Corollas yellow, arcuate-urceolate, the tube glabrous without, pubescent within, ca. 4 mm long, 3 mm wide, the throats ca. 8 mm long, 6 mm wide, capitate-glandular, their lobes broadly cordate,

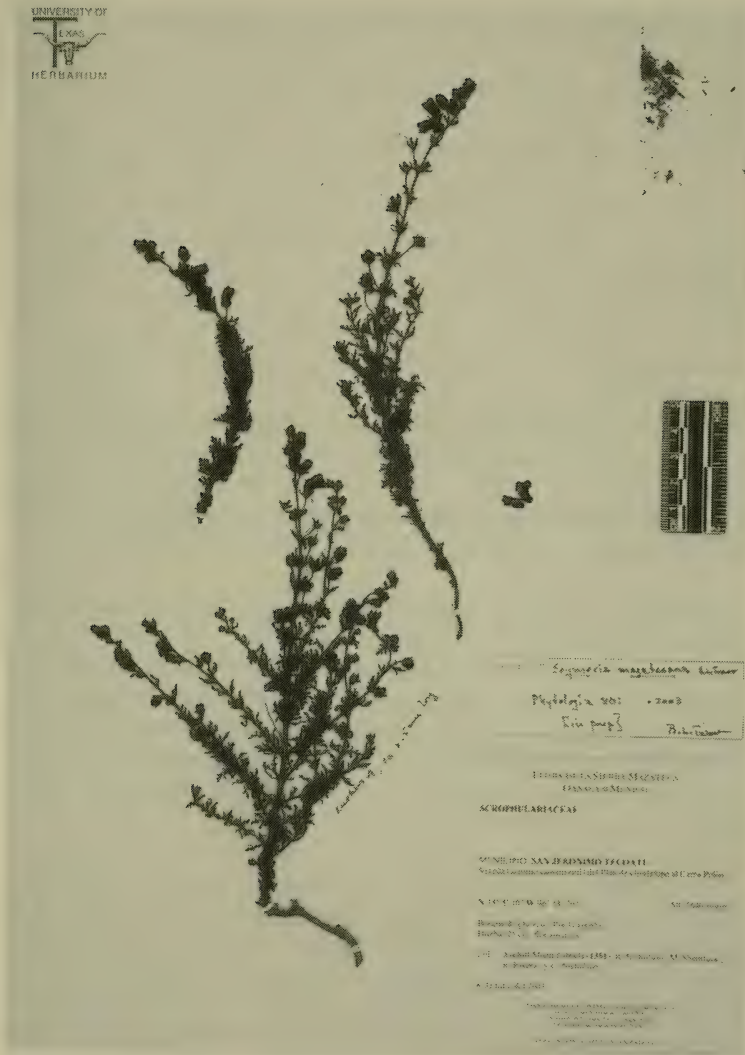


Fig.1. *Seymeria mazatecana*, holotype.

ca. 4 mm long, 4-5 mm wide, having ciliate margins. Stamens 4; anthers 4-5 mm long; filaments 2.0-2.5 mm long, densely pilose to the apex or nearly so. Capsules broadly ovoid, ca. 8 mm high, 6 mm across, capitate-glandular, the style persistent, 6-8 mm long. Seeds (somewhat immature) ca. 15 per locule, ca. 2 mm long, ca. 1.5 mm wide, their margins with narrow undulate wings.

TYPE: **MEXICO. OAXACA:** Mpio. San Jeronimo Tecoatl, "Vereda (antiguo camino real) del Plan de Guadalupe al Cerro Pelon" (18 08 10 N x 96 58 20 W) ca. 2640 m, 6 Jul 2001, *Xochitl Munn-Estrada* et al. 1351 (HOLOTYPE: MEXU; ISOTYPE: TEX).

This species clearly belongs to the *Virgatae* group of *Seymeria* as treated by Pennell (1925) where it will key to the widespread *S. decurva*. It will also key to the latter in my two treatments of *Seymeria* for Mexico (Turner, 1982; 1995). The present novelty differs from *S. decurva* in being a smaller, more compact plant having a villous vestiture on its stems and broadly ovoid capsules (as opposed to ovate-ellipsoid capsules as consistently found in *S. decurva*).

The only specimen of *S. decurva* previously collected in the state of Oaxaca has been that of *Purpus* 3264 (vicinity of "Cerro Verde," this housed at UC). While I examined the latter in my initial study of the group (Turner 1982), I can not recall if it was in fruit or not; at least I did not record the capsule as broadly ovoid, nor the stems as being villous, characters emphasized here. Nevertheless, it is possible that the specimen concerned belongs to *S. mazatecana*, memories being fallible.

The species is named for the sierra where it was first collected. I intended to name the taxon for its principal collector, but when told of my intentions she humbly replied, "Please no, I deplore such honors, besides it would be more meaningfully named for the sierra in which it was collected," or words to that effect. But left to myself I would have preferred this attractive herb bear the name of its collector, Xochitl Munn-Estrada. She is currently enrolled in a graduate program in

botany at The University of Texas, Austin working on a floristic study of the mountains concerned.

ACKNOWLEDGMENTS

I am grateful to my wife Gayle Turner for the Latin diagnosis and to her and Ms Munn-Estrada for reviewing the paper.

LITERATURE CITED

- Pennell, F.W.** 1925. The genus *Afzelia*: a taxonomic study in evolution. Proc. Acad. Nat. Sci. Phila. 77: 335-373.
- Turner, B.L.** 1982. Revisional treatment of the Mexican species of *Seymeria* (Scrophulariaceae). *Phytologia* 51: 403-419.
- 1995. A new species of *Seymeria* (Scrophulariaceae) from Mexico. *Phytologia* 78: 28-35.

**A NEW SPECIES OF *AGERATUM* (ASTERACEAE;
EUPATORIEAE) FROM NAYARIT, MEXICO**

B. L. Turner

Plant Resources Center, University of Texas, Austin 78712-0471, USA

ABSTRACT

A new species, *Ageratum solisii* **sp. nov.**, is described from Mpio. de Huacori, Nayarit, Mexico. It resembles the widespread, highly variable, *A. corymbosum* but is readily distinguished by a combination of characters including deltoid, markedly reticulate leaves, and more numerous much smaller heads. A photograph of the holotype is provided.

KEY WORDS: *Ageratum*, Asteraceae, Eupatorieae, Nayarit, Mexico.

In The Comps of Mexico (Turner 1997) *Ageratum* is recognized as having 11 species; the present novelty brings this total to 12. In my treatment, the new species described below (*A. solisii*) will key to or near *A. tomentosum* (Benth.) Hemsl. because of its suffruticose habit and thick deltoid leaves. The latter taxon is confined to the tri-corner region of the states of Veracruz, Puebla, and Oaxaca and can be immediately distinguished from *A. solisii* by its markedly bicolored leaves and few-headed capitulescence. In reality, *A. solisii* is probably more closely related to the widespread *A. corymbosum* Zucc. ex Pers., but is readily distinguished from this by a combination of characters, as noted in the above abstract.

Ageratum solisii B. L. Turner, **sp. nov.** Fig 1.

Similis *Agerato corymboso* Zucc. ex Pers. sed laminis foliorum deltatis, valde nervatis reticulate infra, et capitulis parvioribus pluribusque per capitulescentiam.

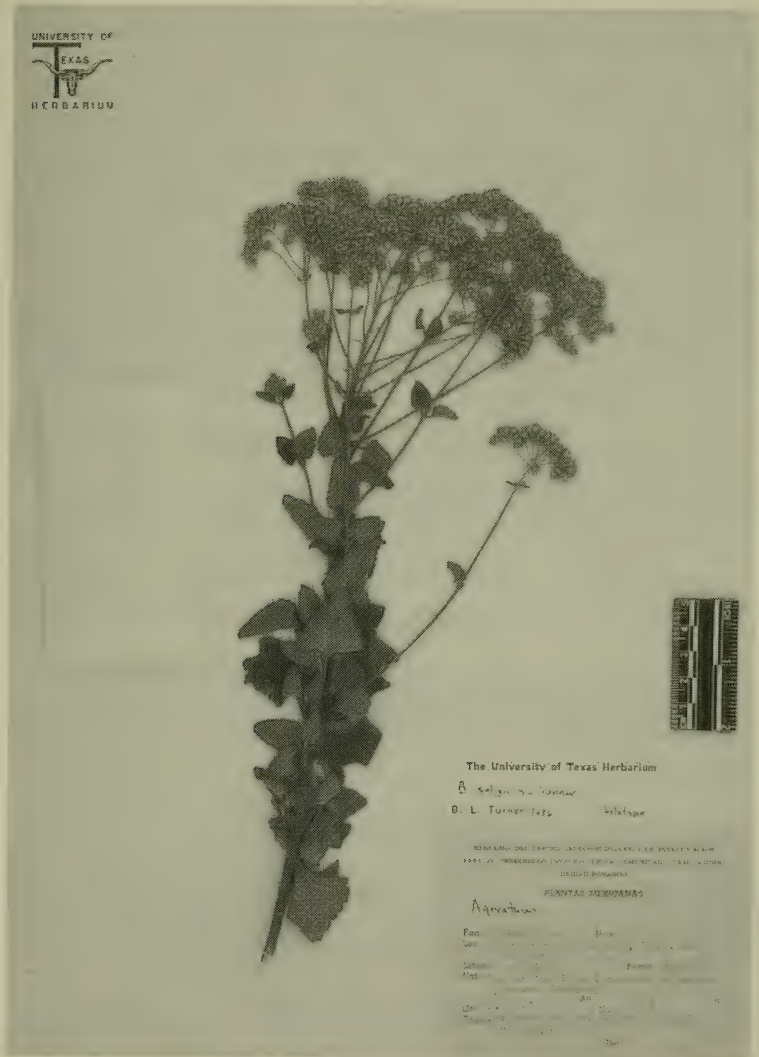


Fig 1. Holotype of *Ageratum solisii*.

Suffruticose herbs or shrublets up to 1 m high. Stems densely hirsute, the vestiture ca. 0.5 mm high. Leaves opposite, pubescent like the stems, 2.0-4.5 cm long, 2-3 cm wide; petioles 0.5-1.0 cm long; blades deltoid, rugose above, markedly reticulate-veined beneath, subcordate at the base; margins irregularly crenate. Heads numerous, arranged in terminal corymbose, somewhat flat-topped capitulescences 12-15 cm across, and about as high, the ultimate peduncles mostly 1-5 mm long. Heads relatively small, campanulate, the involucre ca. 4 mm high, composed of ca. 21 linear scales arranged in 2 series. Receptacle subconical, naked, glabrous, ca 1 mm across, 0.5 mm high. Florets 20-30 per head; corollas white, 1.5-2.0 mm long; throats ca. 1.2 mm long, grading into a weakly defined throat, atomiferous-glandular throughout, the lobes pubescent. Achenes ca. 1 mm long, glabrous; pappus a small saucer-shaped crown of united scales ca. 0.25 mm high.

TYPE: **MEXICO. NAYARIT:** Mpio. de Huajcori, Rancho de Los Sauces, mouth of canyon in "Bosque Templado (encinos chaporros y otros arboles)." 28 Sep 1985, *I. Solis* 517 (HOLOTYPE: TEX).

ADDITIONAL COLLECTION EXAMINED: **MEXICO. NAYARIT:** same locality as type, 30 Sep 1985, *I. Solis* 527 (TEX).

The species is named for Ignacio Solis Cumplido ("Don Nacho") who is a Tepahuan Indian and collected for CIIDR-Durango for several years in extreme southwestern Durango and nearby Nayarit, in the canyon country.

ACKNOWLEDGEMENTS

I am grateful to Gayle Turner for the Latin diagnosis and to Tom Wendt for obtaining information as to the credentials of the collector. M. Dias de Moraes and H. S. Berg provided the digital photos.

LITERATURE CITED

Turner, B.L. 1997. *Ageratum*, in Comps of Mexico 1, *Phytologia* Memoirs 11: 51-55.

**BIDENS MELCHERTII (ASTERACEAE), A NEW SPECIES
FROM JALISCO, MEXICO**

B. L. Turner

Plant Resources Center, University of Texas, Austin 78712-0471, USA

ABSTRACT

A new species, *Bidens melchertii* **sp. nov.**, is described from the state of Jalisco, Mexico. It is closely related to the square-stemmed, white-rayed, perennial, *B. pringlei*, but is readily distinguished from the latter by characters of the achene.

KEY WORDS: *Bidens*, Asteraceae, Mexico, Jalisco.

Preparation of a taxonomic treatment of the genus *Bidens* for Mexico by Prof. Thomas Melchert of the University of Iowa has necessitated description of the following novelty:

***Bidens melchertii* B. L. Turner, **sp. nov.** Fig. 1.**

Similis *Bidens pringlei* S. Wats. sed acheniis sine pappis (non biaristatis) et brevioribus, corporibus tetragonis et non recurvatis.

Erect rhizomatous herbs to 80 cm high. Stems suffruticose, leafy throughout, the lower portions multinerved, the upper essentially square in cross section, glabrous or nearly so. Leaves deeply (1)-2 pinnatisect, 4.0-7.5 cm long; petioles 1-2 cm long; ultimate divisions linear to lance-linear, 0.5-2.0 mm wide, their apices somewhat pungent. Heads showy, 2-3 cm across the expanded rays. Ray florets 8; ligules creamy white, 6-12 mm long, ca. 5 mm wide. Disk florets numerous, yellow. Outer phyllaries ca 10, linear with sharply acute apices, recurving with age. Inner phyllaries yellow-margined. Receptacular bracts linear-lanceolate, their apices extending beyond the

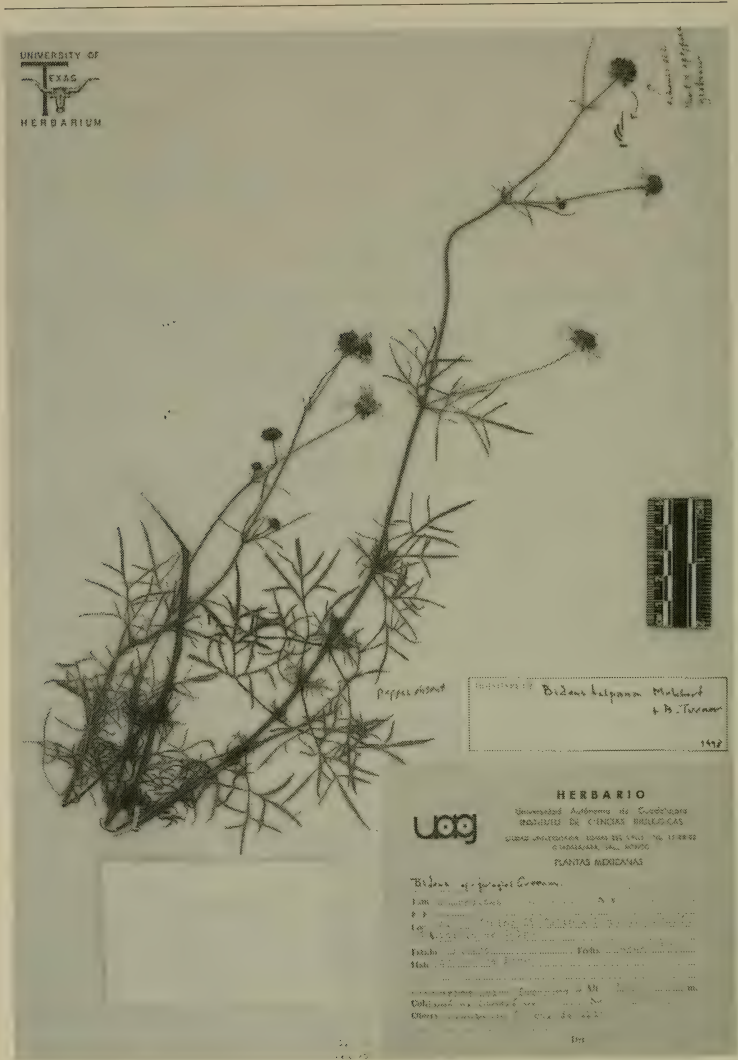


Fig. 1. *Bidens melchertii*, holotype (TEX).

disk florets. Achenes epappose, black, glabrous, ca. as long as the chaff, linear, tetragonal in cross section, the outer series notably incurved and somewhat obcompressed, 3.7-6.0 mm long (the very outermost nearly linear-clavate, the innermost nearly straight, to 8.5 mm long).

TYPE: **MEXICO. JALISCO:** Mpio. De Talpa, "Km. 15 Camino El Tuito a Mina de Zimapan," pine forests, 1650 m, 14 Oct 1989, *Carlos Diaz Luna & Jose A. Lomali S.* 20968 (HOLOTYPE: TEX; ISOTYPE: MEXU).

ADDITIONAL SPECIMEN EXAMINED: **MEXICO. JALISCO:** Mpio. De Talpa, Cerros de Las Minas de Oro, pine-oak forests, 2080 m, 30 Oct 1971, *R. Gonzales T.* 562 (MICH).

Bidens talpana superficially resembles *B. pringlei*, both being square-stemmed perennials with deeply pinnatisect leaves having nearly filiform ultimate segments, and possessing showy white-rayed heads. Their achenes, however, are quite distinct, those of *B. pringlei* having flatter, long-attenuate achenes with slightly recurved biaristate apices (vs. pappus absent). *Bidens talpana* also resembles *B. mollifolia* Sherff, the two taxa having short, clavate to linear-clavate achenes.

The species is named for my sixth academic son, Thomas Melchert, currently Prof. Emer. at the Univ. of Iowa, Ames, and longtime scholar of the genera *Bidens*, *Cosmos*, and *Thelesperma*. He called this novelty to my attention in his submitted manuscript for the upcoming treatment of *Bidens* for Mexico (cf. Turner, Comps of Mexico, Vol. 1. Eupatorieae. *Phytologia Memoirs* 11. 1997). Without his knowledge, I proudly provided the eponym concerned.

ACKNOWLEDGEMENTS

I am grateful to Gayle Turner for the Latin diagnosis; Marta Dias de Moraes and Heidi S. Berg prepared the digital photos.

**A NEW SPECIES OF *TRIXIS* (ASTERACEAE: MUTISIEAE)
FROM OAXACA, MEXICO**

B. L. Turner

Plant Resources Center, University of Texas, Austin 78712-0471, USA

ABSTRACT

Trixis hintoniorum B. L. Turner, **sp. nov.**, is described from Oaxaca, Mexico. So far as known, it is a prostrate shrub with winged stems confined to the rocky beaches of southern Oaxaca, Mpio. Pachutla. A photograph of the holotype is provided.

KEY WORDS: Asteraceae, Mutisieae, *Trixis*, Mexico, Oaxaca.

Routine identification of Mexican Asteraceae has revealed the following novelty:

***Trixis hintoniorum* B. L. Turner, sp. nov.** Fig. 1.

Similis *T. silvaticae* sed foliis crassioribus, caulibus sine alis, flosculis omnibus similaribus, labiis exterioribus 1-2 mm longis.

Shrub, reportedly (from label data) "common" and forming "procumbent" colonies. Stems puberulous, wingless. Larger leaves (ca. 10 cm below capitulescence) 6-8 cm long, 3.5-4.0 cm wide, sessile or nearly so, relatively thick, pinnately venose, somewhat bicolored, moderately appressed-pilose beneath, the margins serrulate. Heads subtended by 2-4 ovate bracts ca. as long as the involucre, mostly arranged 3-5 in terminal congested cymes scarcely exceeding the leaves. Involucral bracts 11, linear-lanceolate, appressed-pubescent, the apices gradually acuminate. Receptacles densely pubescent, the hairs 0.5-1.0 mm long. Florets ca. 23, the corollas yellow, all more or less alike, those at the periphery with outer lips 1-2 mm long. Achenes (immature) ca. 5 mm long, densely pubescent throughout; pappus of numerous tawny bristles 9-10 mm long.

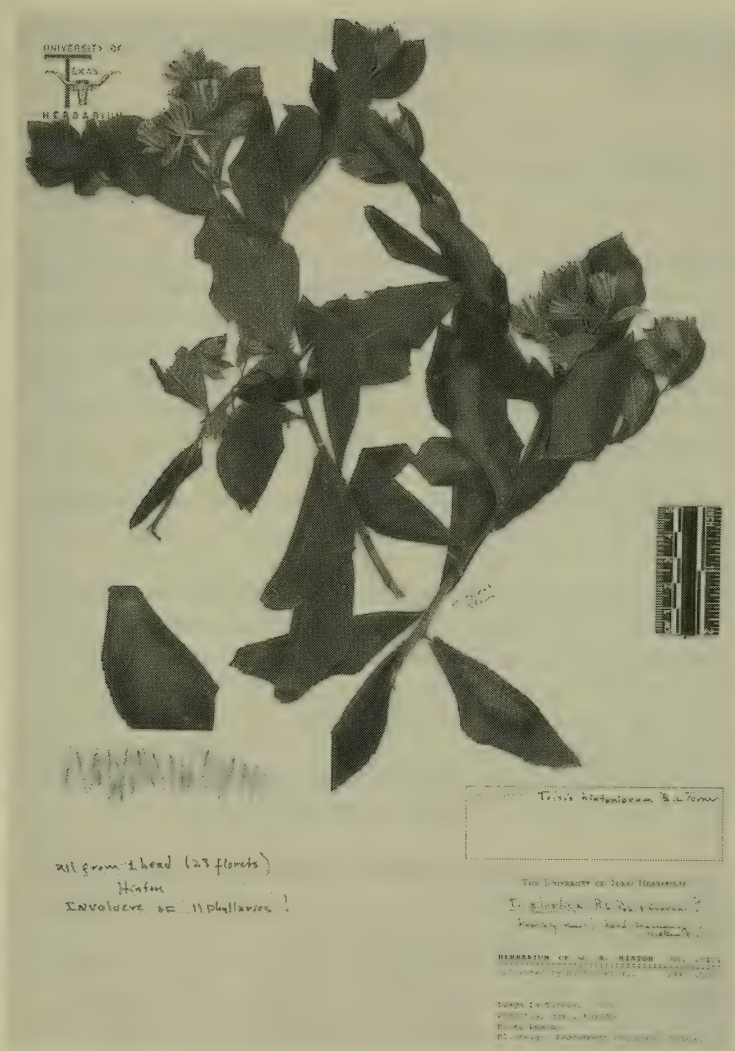


Fig. 1. *Trixis hintoniorum* (Holotype TEX).

TYPE: MEXICO. OAXACA: Mpio. Pochutla, Playa La Tijera, sea level along rocky beaches, 27 Oct 1995, *Hinton et al.* 26474 (Holotype TEX).

In Anderson's (1972) treatment of *Trixis*, because of its wingless stems, this taxon will key to or near *T. megalophylla* Greenm. and/or *T. silvatica* Robinson & Greenm., but it is markedly different from both. According to label data and appearance of pressed material, *T. hintoniorum* is a prostrate shrub occurring along the beach. In habit and leaf shape it resembles *T. silvatica*, but possesses thicker leaves and larger, more numerous-flowered heads, having 11 involucre bracts (versus 8). *Trixis hintoniorum* also has characteristics of *T. parviflora*, a coastal species of northern Oaxaca and Guerrero, but the latter possesses narrower thinner leaves, the heads with only 8 involucre bracts and 10-13 florets.

It should be noted that Anderson, in her discussion of *T. silvatica*, mentioned a single "population" of the latter to have 11-13 involucre bracts and 27-29 florets per head (specimen not cited). This description fits the heads of *T. hintoniorum*, but corollas of the latter have markedly small lips (1-2 mm long vs 3.1-4.0 mm) and, as already noted, has markedly winged stems.

ACKNOWLEDGEMENTS

I am grateful to Gayle Turner for the Latin diagnosis and to her and Ms. Xochitl Munn-Estrada for reviewing the paper.

LITERATURE CITED

- Anderson, C.** 1972. A monograph of the Mexican and Central American species of *Trixis* (Compositae). Mem. N. Y. Bot. Gard. 22: 1-68.

**ELEVATION OF *STEVIA LEMMONII* VAR. *HISPIDULA*
(ASTERACEAE: EUPATORIEAE) TO SPECIFIC RANK**

B. L. TURNER

Plant Resources Center, University of Texas, Austin 78712-0471, USA

Grashoff (1972, 1974) described *Stevia lemmonii* A. Gray var. *hispidula* Grashoff, distinguishing this from its sister taxon, *S. l.* var. *lemmonii*, by its glandular-pubescent involucres (vs. eglandular) and its more southern distribution. He commented further that "It would appear from the ranges of the two varieties [Fig.1] that var. *hispidula* is the more primitive of the two, var. *lemmonii* being a more northern, glandular taxon." Grashoff also noted that "neither Gray (1882) nor Robinson (1930) ever mentioned the glandular pubescence of the typical variety, although they often placed great emphasis on this character in other groups."

In my recent account of *Stevia* for Mexico (Turner, 1997) I largely followed Grashoff's treatment, this based upon relatively few specimens. Subsequent collections of this duo from northwestern Mexico suggest that they are worthy of specific rank, at least I have not found that these two allopatric sister taxa show any signs of intergradation. My views regarding the treatment of such infraspecific variation are discussed in more detail elsewhere (Turner and Nesom, 2000). The necessary nomenclature follows:

***Stevia hispidula* (Grashoff) B. L. Turner, stat. nov.**

BASIONYM: *Stevia lemmonii* var. *hispidula* Grashoff, Brittonia 26: 364. 1974.

Turner (1997) noted that Grashoff cited a single specimen (Gentry 5587) from Sinaloa, Mexico that he referred to var. *lemmonii*. At the time I took the collection concerned to be a "stipitate-glandular form" of var. *hispidula*. Recent collections from the area concerned now suggest that Grashoff was correct in his original observation.

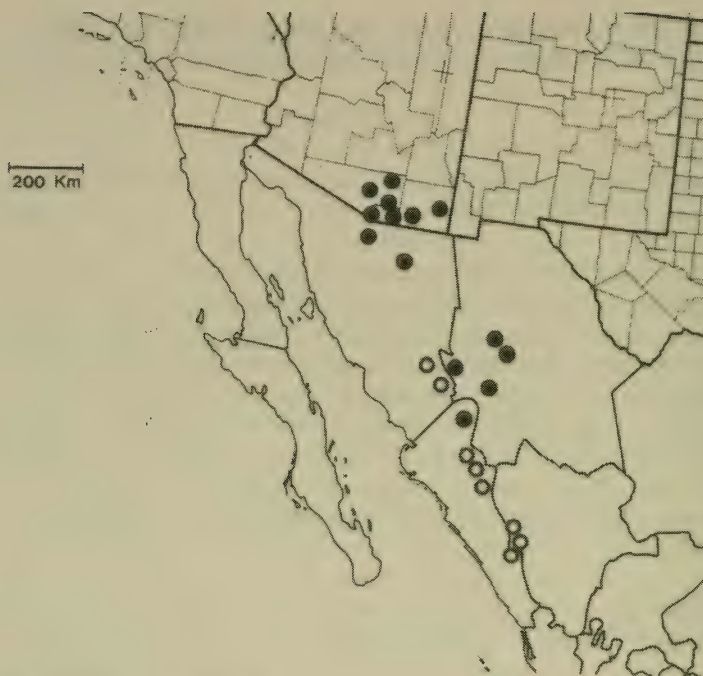


Fig 1. Distribution of *Stevia lemmonii* (closed circles) and *S. hispidula* (open circles).

LITERATURE CITED

Grashoff, J. 1972 A systematic study of the North and Central American species of *Stevia*. Doctoral Dissertation, the University of Texas, Austin.

----- 1974. Novelties in *Stevia* (Compositae: Eupatorieae). *Brittonia* 26: 347-384.

Turner, B. L. 1997. , in *Comps of Mexico* 1, *Phytologia* Memoirs 11: 170-197.

- and G. Nesom. 2000. Use of variety and subspecies and new varietal combinations for *Styrax platanifolius* (Styracaceae). Sida 19: 257-262.

BOTANICAL ANECDOTES: *Bajacalia moranii* (Asteraceae: Tageteae), comments of James Reveal regarding its discovery

B. L. Turner

Plant Resources Center, University of Texas, Austin 78712-0471, USA

Recent description (Loockermann et al. 2003) of the new species, *Bajacalia moranii* B. L. Turner elicited the following email from James L. Reveal, who participated in its discovery, type material having been collected with Reid Moran on a joint collecting trip to Baja California during February of 1973.

Morning Billie: ‘

A tale about the discovery of *Bajacalia moranii*.

We drove down Arroyo de Portezuelo looking for *Eriogonum encelioides*, a plant found in 1947 by Scott Gentry. Upon finding a few shrubs, we stopped the jeep and I got out my stuff to write a description based on what I could see in the field.

Reid said he had to visit a bush.

I said I would look further down the arroyo to see what the variation might be. He went up the draw; I went down the draw.

Just around the corner I found what proved to be *Eriogonum preclarum* and yelled back to Reid that we would be a while as I found a new buckwheat.

He yelled back that it was okay. He was taking a dump and a new *Porophyllum* was by his side.

Ahhh, how one finds new species....

-Jim

The new species of *Porophyllum*, declared to be so by Reid and confirmed in the afore mentioned study with the description of *B. moranii*, was never published of course, but had I known the details of its discovery I might have provided a very different Latin name!

I am grateful to my friend Jim who permitted my use of his email communication dated 14 Mar 2003.

LITERATURE CITED

- Loockerman, D. J., B. L. Turner, and R. K. Jansen.** 2003. Phylogenetic relationships within the Tageteae (Asteraceae) based on nuclear ribosomal ITS and chloroplast *ndhF* gene sequences. *Systematic Botany* 28: 191-207.

BOTANICAL HUMOR



"Look, Professor, I found it! The last existent *Terminalia ultimata*!"

In June of 1994 my family and I traveled through Scotland for two weeks. It was the second summer after I had discovered Botany and I was determined to learn every plant in Scotland by feverishly collecting every species and keying them out in Stace (1991). One plant, *Circea lutetiana* L., was described as rare in Northern Scotland. Not quite understanding if "rare" meant endangered or simply not common I fretted that I had extirpated the last population of *C. lutetiana* in Scotland. My father related this story to a friend of the family, Molly Sadler. Molly, a teacher of ESL at Amarillo College, illustrates as a hobby and has had works published in the Wall Street Journal and Forbes. With my father's (much embellished) story as inspiration she drew the above picture. The illustration is proudly displayed in my office and it is with much joy that I present it in *Phytologia*. **-Justin Williams, Editor**

Stace, C. 1991. New Flora of the British Isles. University of Cambridge Press. Pp 1226.

INDEX TO NEW NAMES AND COMBINATIONS IN PHYTOLOGIA 87(1)

<i>Ageratum solisii</i> B. L. Turner, sp. nov.	44
Anisopappinae Panero, subtrib. nov.	5
Athroisminae Panero, subtrib. nov.	2
<i>Bidens melchertii</i> B. L. Turner, sp. nov.	47
Centipedinae Panero, subtrib. nov.	3
Chromolepidinae Panero, subtribus nov.	5
Doroniceae Panero, tribus nov.	1
Dugesiinae Panero, subtribus nov.	7
Dyscritothamninae Panero, subtribus nov.	10
Enceliinae Panero, subtribus nov.	8
<i>Euphrosyne acerosa</i> (Nutt.) Panero, comb. nov.	13
<i>Euphrosyne dealbata</i> (A. Gray) Panero, comb. nov.	13
<i>Euphrosyne nevadensis</i> (M. E. Jones) Panero, comb. nov.	13
<i>Haplodontium macrocarpum</i> (Hook. ex Drumm.) J.R. Spence, comb. nov.	26
<i>Haplodontium tehamense</i> (Showers) J.R. Spence, comb. nov.	26
Jaegeriinae Panero, subtribus nov.	11
<i>Leptostomopsis</i> (C. Muell.) J.R. Spence & H.P. Ramsay, stat. nov.	23
<i>Plagiobryoides</i> J.R. Spence, gen. nov.	24
<i>Plagiobryoides incrassatolimbata</i> (Card.) J.R. Spence, comb. nov.	25
<i>Ptychostomum angustifolium</i> (Brid.) J.R. Spence & H.P. Ramsay, comb. nov.	23
<i>Ptychostomum archangelicum</i> (B.S.G.) J.R. Spence, comb. nov.	20
<i>Ptychostomum arcticum</i> (R. Br.) J.R. Spence, comb. nov.	20
<i>Ptychostomum badium</i> (Brid.) J.R. Spence, comb. nov.	20
<i>Ptychostomum bimum</i> (Schreb.) J.R. Spence, comb. nov.	20
<i>Ptychostomum calophyllum</i> (R. Br.) J.R. Spence, comb. nov.	20
<i>Ptychostomum creberrimum</i> (Taylor) J.R. Spence & H.P. Ramsay, comb. nov.	23
<i>Ptychostomum cryophilum</i> (Mårt.) J.R. Spence, comb. nov.	20
<i>Ptychostomum curvatum</i> (Kaur. & Arn.) J.R. Spence, comb. nov.	20
<i>Ptychostomum cyclophyllum</i> (Schwaegr.) J.R. Spence, comb. nov.	20
<i>Ptychostomum inclinatum</i> (C. Muell.) J.R. Spence, comb. nov.	21
<i>Ptychostomum intermedium</i> (Brid.) J.R. Spence, comb. nov.	21
<i>Ptychostomum knowltonii</i> (Barnes) J.R. Spence, comb. nov.	21
<i>Ptychostomum lonchocaulon</i> (C. Muell.) J.R. Spence, comb. nov.	21
<i>Ptychostomum longisetum</i> (Bland. ex Schwaegr.) J.R. Spence, comb. nov.	21
<i>Ptychostomum marratii</i> (Hook. & Wils.) J.R. Spence, comb. nov.	21
<i>Ptychostomum meesioides</i> (Kindb.) J.R. Spence, comb. nov.	21
<i>Ptychostomum neodamense</i> (Itzigs.) J.R. Spence, comb. nov.	21
<i>Ptychostomum pallens</i> (Sw.) J.R. Spence, comb. nov.	21

<i>Ptychostomum pallescens</i> (Schleich.) J.R. Spence, comb. nov.	21
<i>Ptychostomum pseudotriquetrum</i> (Hedw.) J.R. Spence & H.P. Ramsay, comb. nov.	23
<i>Ptychostomum purpurascens</i> (R. Br.) J.R. Spence, comb. nov.	22
<i>Ptychostomum reedii</i> (Robins.) J.R. Spence, comb. nov.	22
<i>Ptychostomum rutilans</i> (Brid.) J.R. Spence, comb. nov.	22
<i>Ptychostomum salinum</i> (Hag. ex Limpr.) J.R. Spence, comb. nov.	22
<i>Ptychostomum schleicheri</i> (Schwaegr.) J.R. Spence, comb. nov.	22
<i>Ptychostomum turbinatum</i> (Hedw.) J.R. Spence, comb. nov.	22
<i>Ptychostomum warneum</i> (Röhl.) J.R. Spence, comb. nov.	22
<i>Ptychostomum weigeliai</i> (Spreng.) J.R. Spence, comb. nov.	22
<i>Ptychostomum wrightii</i> (Sull. & Lesq.) J.R. Spence, comb. nov.	22
<i>Seymeria mazatecana</i> B. L. Turner, sp. nov.	40
<i>Spilanthinae</i> Panero, subtribus nov.	9
<i>Stevia hispidula</i> (Grashoff) B. L. Turner, stat. nov.	53
<i>Trixis hintoniorum</i> B. L. Turner, sp. nov.	50



3 5185 00288 4128

SUBSCRIPTION INFORMATION

PHYTOLOGIA is published three times a year, P.O. Box 2012, Sam Houston State University, Huntsville, TX 77341-2012. Annual domestic individual subscription (3 issues): \$30.00. Annual domestic institutional subscription (3 issues): \$90.00. Foreign and/or airmail postage extra.

INFORMATION FOR AUTHORS

Articles from botanical systematics and ecology, including biographical sketches, critical reviews, and summaries of literature will be considered for publication in *PHYTOLOGIA*. Authors should arrange for two workers in the appropriate field to review the manuscript before submission. Copies of reviews should be forwarded to the editor with the manuscript. Additional review may occur for articles proposing significant nomenclatural changes and or revisions to established taxa. Effort will be made to locate a reviewer for author(s) if he/she desires. Articles should be submitted digitally, either by disk, CD or email. Language of manuscripts may be either English or Spanish. Format of articles should follow past issues of *PHYTOLOGIA* (preferably single spaced and Times New Roman in 10 point font.)

Cost of publication is currently \$15.00 US per page for publication without reprints. PDF files of reprints will be made available to authors upon request. Page charges are due with manuscripts. No extra charges are made for line drawings or grey scale photos. Extra fees will be charged for color photos, the charge will be determined on an individual basis.

LUESTER T. MERTZ
LIBRARY

JUN 02 2005

NEW YORK
BOTANICAL GARDEN

